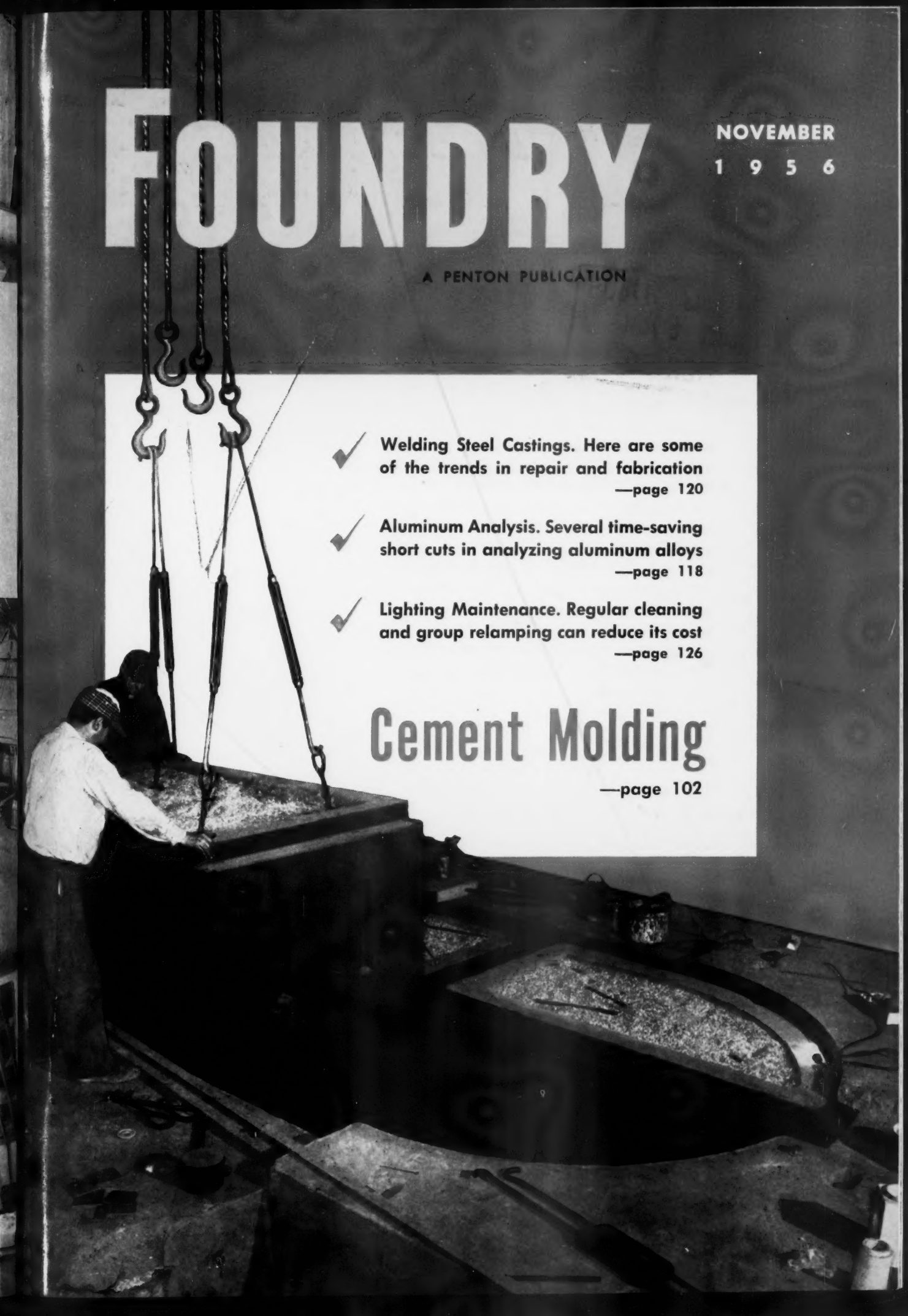
FOUNDRY

NOVEMBER
1 9 5 6

A PENTON PUBLICATION



✓ **Welding Steel Castings. Here are some of the trends in repair and fabrication**
—page 120

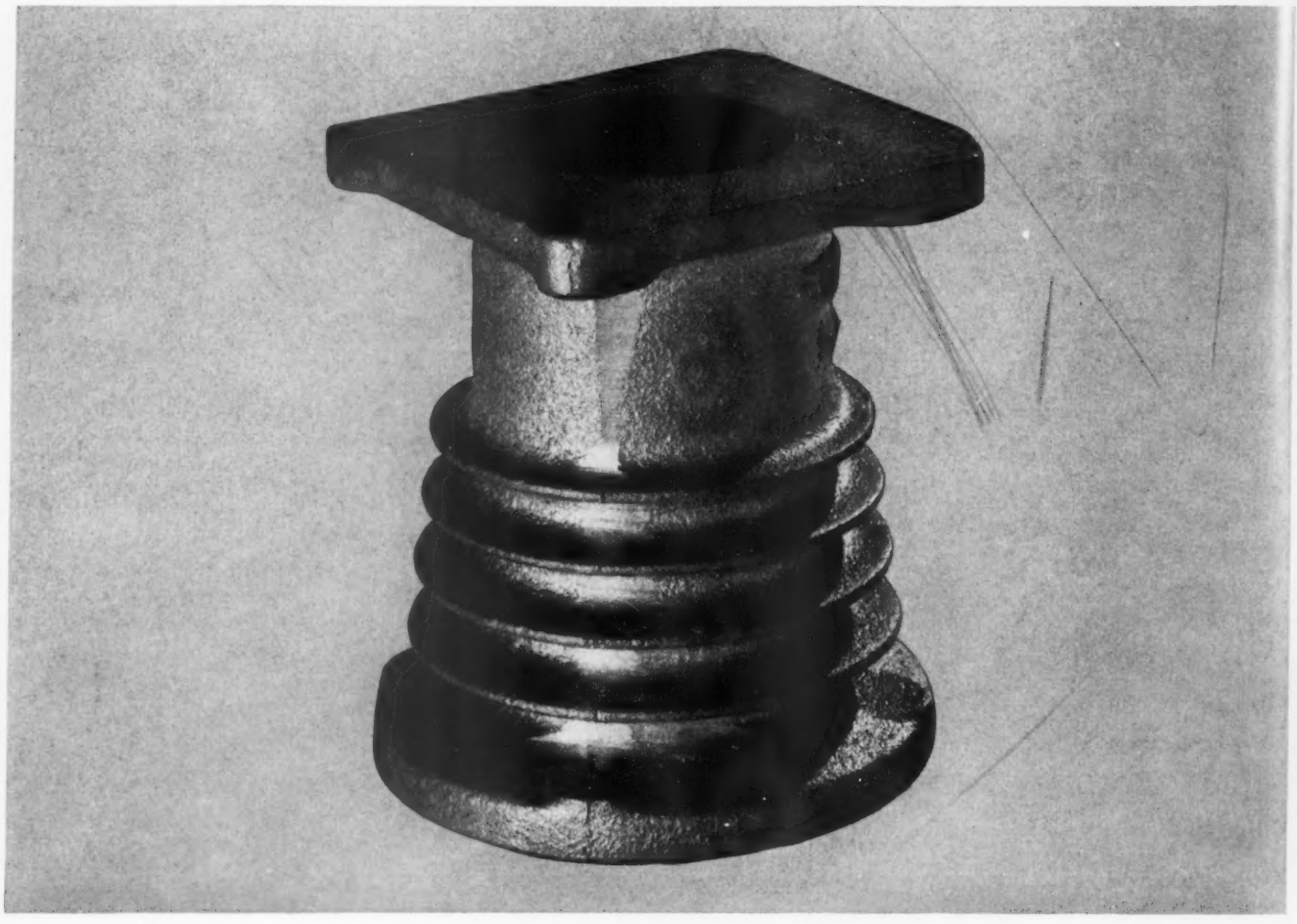
✓ **Aluminum Analysis. Several time-saving short cuts in analyzing aluminum alloys**
—page 118

✓ **Lighting Maintenance. Regular cleaning and group relamping can reduce its cost**
—page 126

Cement Molding

—page 102

Q. *How can you produce* **GRAY IRON CASTINGS** *with* **SUPERIOR HEAT** *and* **WEAR RESISTANCE?**



A. FERROCARBO® *by* CARBORUNDUM

REGISTERED TRADE MARK

A DISPERSED STRUCTURE, free from segregations, is the secret of castings that resist extremes of heat and friction. When you treat your gray iron with FERROCARBO® in patented briquette form, your customers get castings with superior strength and toughness... for automotive cylinder blocks, pumps, manifolds, and similar applications. And machining tests in eleven leading shops prove that Ferrocarbo-treated castings averaged 89.5% greater machinability per tool than untreated castings.

RAW MATERIAL COSTS to you are less, because deoxidizing with FERROCARBO® generally permits use of cheaper melting materials in the charge... so you make worthwhile savings, while giving your customers *premium* castings. Over 600 leading foundries are now using FERROCARBO® to produce both malleable and gray iron castings. Are *you* among them?

FREE BOOKLET... gives advantages of FERROCARBO®, instructions for use, results. Write The Carborundum Company, Dept. F 84-66, Niagara Falls, New York.

FERROCARBO® DISTRIBUTORS:

KERCHNER, MARSHALL & CO.
PITTSBURGH • Cleveland • Buffalo
Philadelphia • Birmingham • Los Angeles

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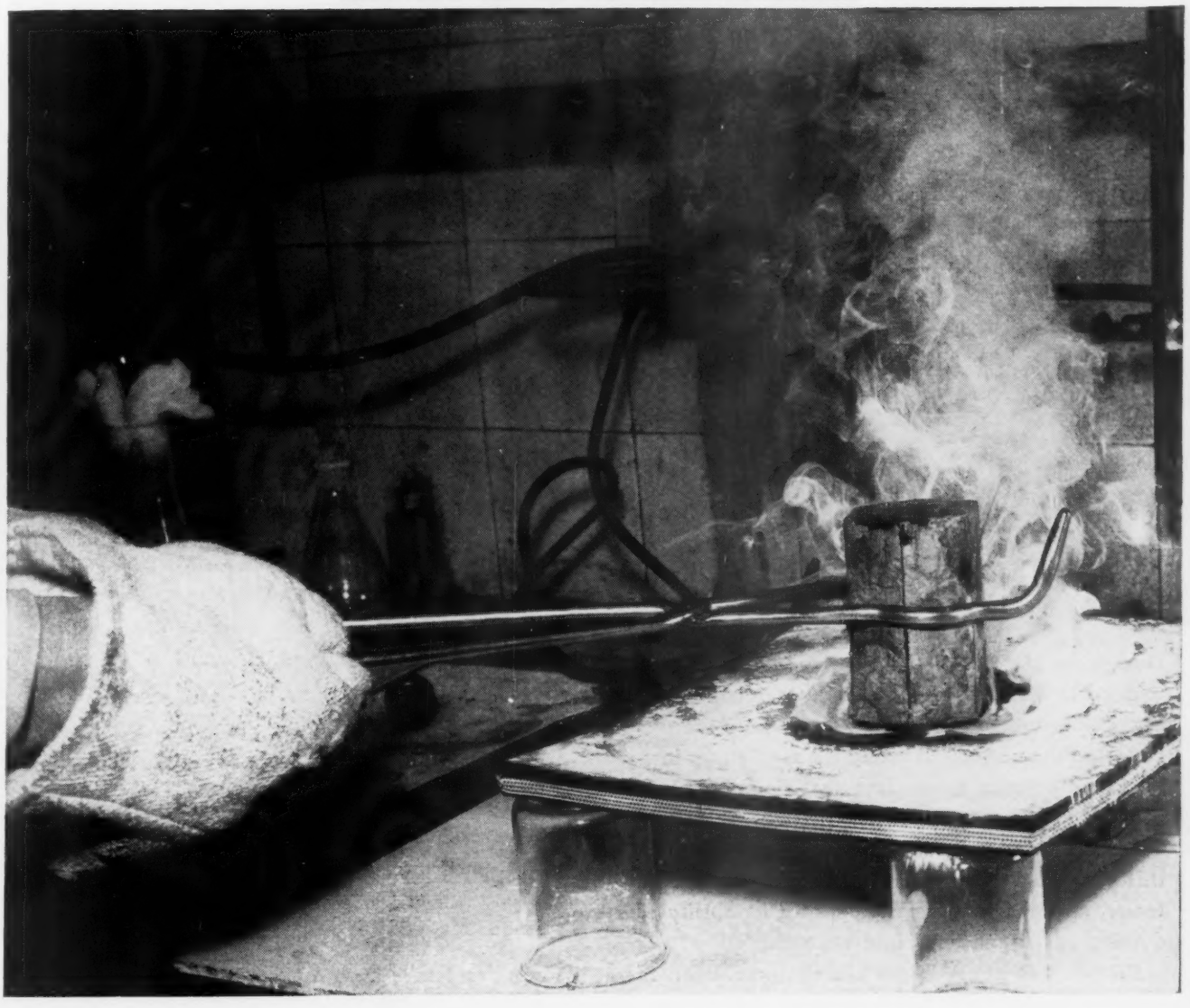
Circle 551 on Inquiry Card—Page 255

B.F.Goodrich



Red-hot metal won't burn through this B.F.Goodrich conveyor belt

New fire curtain means longer life for hot-material belts

SCORCHING chunks of metal that sometimes land on foundry conveyor belts won't burn holes through a B. F. Goodrich conveyor belt with the built-in fire curtain.

This new protective shield is two layers of glass fabric that B. F. Goodrich puts into the top cover of hot-material conveyor belts. If a hot chunk of metal accidentally drops on the belt, the rubber cover chars at the spot, but only down to the glass fabric fire curtain. Since the hot object doesn't penetrate the glass fabric barrier, the belt keeps its strength and so, of course, lasts longer than belts without this protection.

To demonstrate the effectiveness of the fire curtain, tests were run on two hot-material belts. One belt had the B. F. Goodrich fire curtain protection; the other did not. A red-hot steel bar was placed on each belt. It burned through the rubber covers on both belts. And it burned a hole clear through the unprotected belt. But the B. F. Goodrich fire curtain stopped the burning chunk, so that the body of the protected belt was undamaged.

The fire curtain protection is ideal for foundry service where burnt holes are the major cause of short belt life. It can be built into any B. F. Goodrich hot-material belt. Talk it over with a B. F. Goodrich distributor and see if this new belting improvement is the answer to your hot material problems. *B. F. Goodrich Industrial Products Company, Dept. M-782, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Circle 554 on Inquiry Card—Page 255

ALCHEMY WON'T WORK ON BENTONITE *either!*

During the Middle Ages, alchemists worked in vain to discover the secret of transmuting common metals into gold. *Modern day alchemists* are no more successful in their efforts to produce a *satisfactory* low-viscosity-bentonite from clays that do not possess this desirable quality. It is true that adding certain chemicals to bentonite will lower its viscosity. *But,* this "alchemy" also lowers the durability of bentonite, so it burns out faster, losing its ability to develop green and dry bond strength.

Federal uses no "alchemy" in the production of Federal GREEN BOND Bentonite! It doesn't have to — for low viscosity * is a *natural* characteristic of the bentonite clay from which Federal GREEN BOND is produced. Federal engineers test-drill bentonite deposits *before* mining — select *only* those lots with natural low viscosity for the production of Federal GREEN BOND Bentonite.

Federal GREEN BOND, therefore, is a pure mineral product — *unadulterated, untreated.* And, because it is free of harmful chemicals, its durability is unimpaired, its ability to develop high green and dry strength retained much longer.

So, don't take a chance on "alchemy" — when you can *depend* on Federal GREEN BOND — the best of the bentonites. (Write for your copy of "Tailor-Made Molding Sands".)

The FEDERAL FOUNDRY SUPPLY *Co.*

4600 EAST 71st STREET
CLEVELAND 5, OHIO

*Federal GREEN BOND'S low viscosity enables users to temper sand with less water, get optimum strength with less mulling time, when "dry ad-mixed" to sand. When used as an additive to "slurry", up to 25% more GREEN BOND may be added to the water, to produce a more potent slurry and provide easier control of moisture and sand strength.

AVAILABLE IN PULVERIZED, GRANULAR AND *quick-dispersing* SLURRY GRADES

FOUNDRY
A PENTON PUBLICATION

November 1956
Volume 84—Number 11

Editorial 101

SPECIAL ARTICLES

Cement Molding at Chambersburg 102
New $1 million foundry makes castings in cement-bonded sand that vary in weight from 1 to 150,000 lb—By KENNETH L. MOUNTAIN

The Brass Foundry 108
Sixteenth article in series discusses the theory of solidification and its relationship to gating and risering—By HARRY ST. JOHN

Production Depends Upon People 112
Two-part article covers need for developing young men from apprentice to management positions—By J. W. SCHNEIDER and R. H. HERRMANN

Short Cuts in Analyzing Aluminum Alloys 118
Author provides some time and money-saving modifications of standard procedures in analyzing aluminum alloys—By CHARLES GOLDBERG

Current Trends in Welding Steel Castings 120
Review of recent advances in the welding of steel with emphasis placed on several specific techniques—By DR. WILLIAM H. RICE

Lighting Maintenance 126
Hints on cleaning and maintaining industrial lighting systems that will return handsome economical benefit—By J. L. TUGMAN and D. R. PHILLIPS

New Plant Produces Mercury Investment Castings 133
Foundry uses frozen mercury patterns to make ceramic molds into which nearly all castable alloys can be poured—By T. A. DICKINSON

OTHER FEATURES

International Foundry Congress and Exhibition By VINCENT DELPORT .. 148
Third Generation Operates California Brass Foundry By DEWAR FORBES 164
Handling Foundry Materials by Lift Truck 174
NFA Holds 58th Annual Meeting 180
Market Research Pushed by Steel Founders' Society By WILLIAM G. GUDE 182
Man-to-Man By RALPH L. LEE 191
Meditations of a Sandman By HAROLD E. HENDERSON 205
How Do You Rate Your Foremen? By ROBLEY D. STEVENS 218
Malleable Founders' Society Fall Meeting By KENNETH L. MOUNTAIN .. 230
Hook Scale Facilitates Casting Production By GILBERT C. CLOSE 232
Chlorides Used in New Nodular Iron Process 234
Reduction of Noise Can Increase Production By ERNEST W. FAIR 280

NEWS FEATURES

Around the Country 212
Calendar of Meetings 14
Foundry Group Meetings 240
Industry Briefs 200
Late News 33
Men of Industry 140
News Views 171
Obituary 195

REGULAR DEPARTMENTS

Classified Advertising 306
Data Sheet 285
Foundry Developments 198
How To Do It 202
Helpful Foundry Literature .. 255
New Equipment and Supplies .. 252
Questions and Answers 136
The Shakeout 294
Statistics 277
With the Editors 10

Business Staff—page 319
Advertisers' Index—page 319

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(For addresses of branch offices, see page 319)

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NO LONGER ONLY FIVE...BUT
LINOIL
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PRODUCTS DIVISION
2191 WEST 110th ST.
CLEVELAND 2,
OHIO

Seven Top Performers!

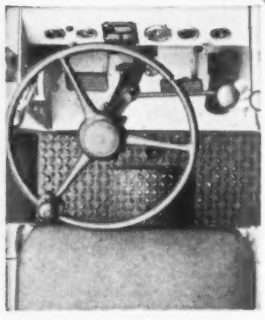
Foundrymen who like to see well-balanced core room operations will put their seals of approval on two newcomers to the Archer quality line of sand additives... LIN-O-SET and ADCOSIL.

Why not get these top performers into the act saving production dollars in your foundry? Write for technical bulletins.

Your Operator "Steps Lively" and likes it

. . . with an Allis-Chalmers Fork Truck!

The operator of this Allis-Chalmers 4,000-lb fork lift truck at a large mid-west foundry is able to "step lively" because his truck drives so easily — maneuvers so well, even in tight quarters.



Important controls are at the operator's finger tips — right where he would like to have them. Gauges are in plain sight — simple and easy to read. Floor is clear, seat can be moved forward or back to suit the operator.

Your operator moves about quickly, spots loads accurately, works relaxed all day. His output is big and steady . . . his contentment is your gain.

These are benefits of the operating ease found in Allis-Chalmers fork lift trucks. Even a green operator does the right thing almost by reflex. He could find the clutch, brake, accelerator and gear shift lever with his eyes shut, for they are positioned like those in his car. The large, 18-inch steering wheel is comfortably positioned and feels "at home" in his hands.

The seat is wide and comfortable, the floor is free of obstructions. Operator can quickly step on or off either side. There is an over-all roomy comfort that seems to stretch a day's output and shorten a day's work.

Examine one of these units at your Allis-Chalmers Materials Handling Dealer's. Ask him to show you the long-life features that keep it going at a lively pace with a minimum of maintenance. Write for free descriptive bulletin, "Put Yourself in the Driver's Seat."

MATERIAL HANDLING DEPT., BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

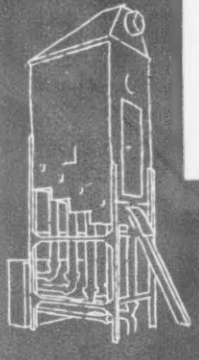
BH-16C

These six foundries are saving a total of $29,700 a month, every month, with National Sand Recovery Systems

Can You Afford *Not* to Reclaim *Your* Sand?

FOUNDRY	A	B	C	D	E	F
Cost of New Sand	$10.09/T	$7.58/T	$7.50/T	$5.50/T	$5.79/T	$7.00/T
Cost of Reclamation (-)	0.52/T	0.44/T	1.13/T*	0.49/T	0.69/T	0.67/T
Savings on Sand	$ 9.57/T	$7.14/T	$6.37/T	$5.01/T	$5.10/T	$6.33/T
Sand used per month (x)	1000/T	600/T	1000/T	600/T	600/T	720/T
$ Savings per month	$9570	$4284	$6370	$3006	$3060	$4558
Cost of installation Amortized (projected)	3-4 mo.	11-12 mo.	7-8 mo.	11-12 mo.	6-7 mo.	9-10 mo.

*User operates two units.



These figures represent actual dollar savings realized by six average foundries who are now operating the National Sand Recovery System. To them we would like to add these statements, selected at random from letters received from far sighted foundrymen who are now operating over 30 National Sand Recovery units throughout the country:

"The simplicity of operation, compactness of installation, extremely low maintenance cost, easy disposal of refuse material, and the inherent cleanliness attached to this type of unit, in our opinion, all tend to make such a unit indispensable to the modern foundry."

"We have been continually producing castings using all-reclaimed sand with results equal to that of all-new sand. Operator cost for reclaiming has been nil—under one-half of one manhour per eight hour shift."

"About half of our total new sand requirement has been replaced by reclaimed sand and the savings obtained allowed us to pay off the capital investment in ten months. We had another type sand reclaimer which was replaced by your unit."

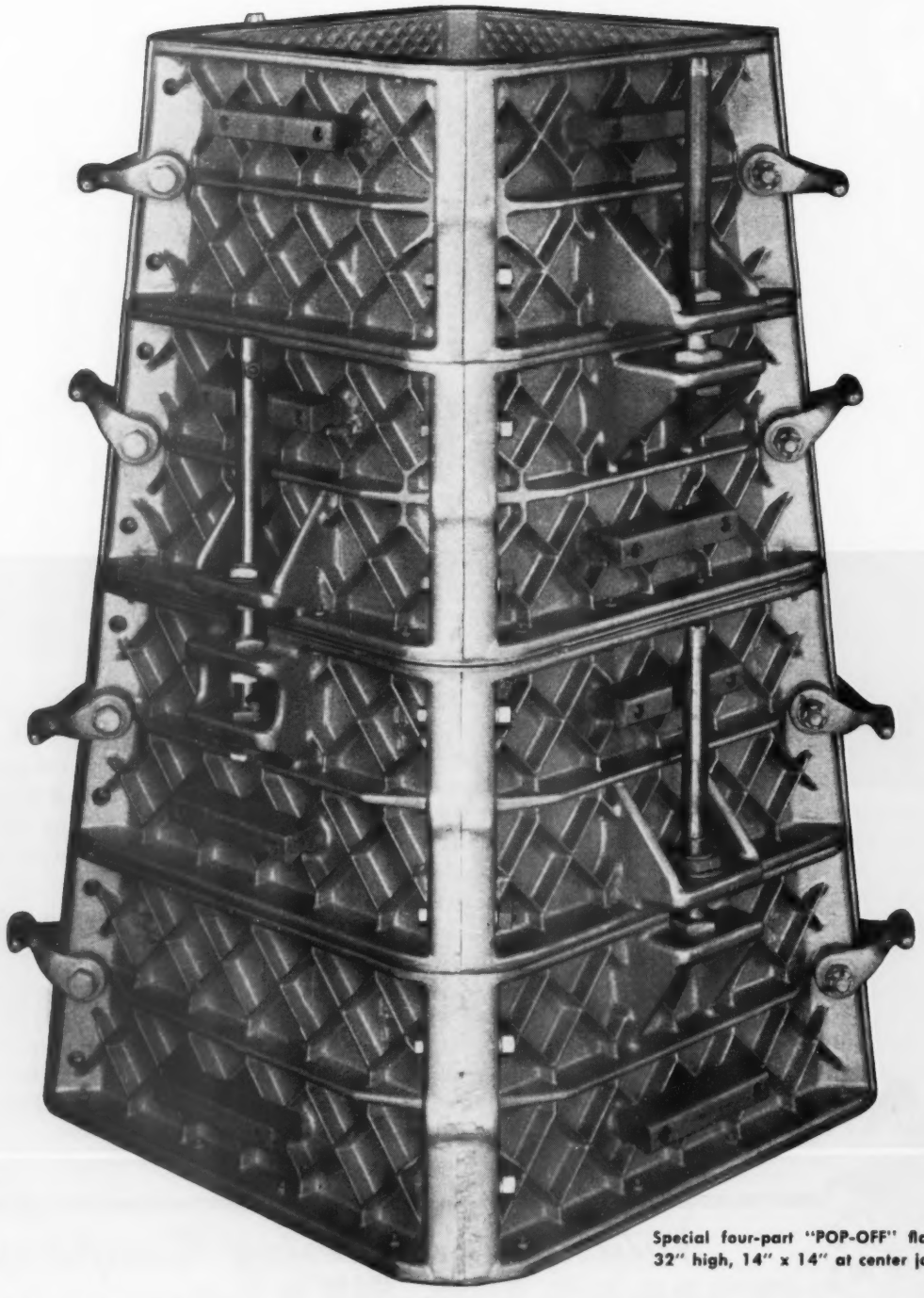
... "It's the best buy in foundry equipment today."

Your National agent can show you the unprecedented dollar saving advantages of pneumatic reclamation *in action* . . . call him today and arrange to visit a National Sand Recovery installation in your area.

National Engineering Company
(Not Inc.)
646 Machinery Hall Bldg. • Chicago 6, Illinois

Circle 559 on Inquiry Card—Page 255

when you need FLASKS



Special four-part "POP-OFF" flask, 32" high, 14" x 14" at center joint

...you're better off with "POP-OFF"

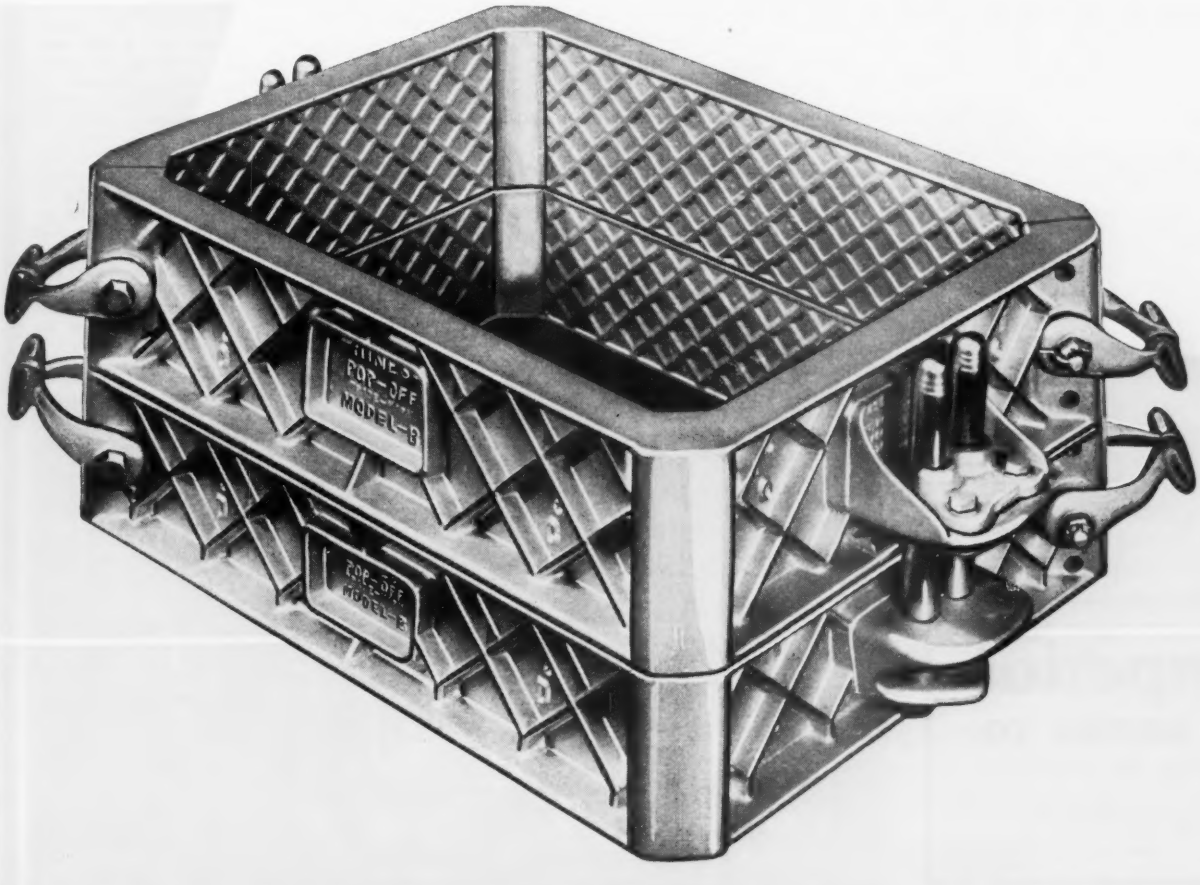
HINES FLASKS

HINES POP-OFF FLASK

THE HINES FLASK CO.

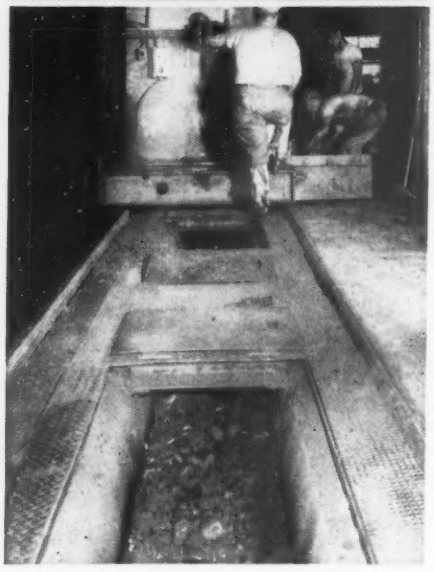
3431 WEST 140th STREET
CLEVELAND 11, OHIO

Standard aluminum "POP-OFF" flask, light in weight, extremely durable



Circle 560 on Inquiry Card—Page 255

This foundry DOUBLED BELT LIFE by switching to IMPERIAL



Long-wearing Imperial Belting gives maximum economy

Sand and metal with temperatures up to 500° F. drop directly on an Imperial Stitched Canvas Super Insulated Sahara Conveyor Belt used in the foundry of Empire Steel Castings.

That's rugged service . . . with the belt subject to damage by tearing, heat, impact and abrasion. Yet the Imperial Belt used (217′ x 24″ x 6 ply, with armored reinforcement) has been in operation 24 hours a day since January, 1954. This is double the life of belting used previously, the foundry operators report.

Imperial Sahara Belting is job-designed to outwear any other belting made for foundry service . . . and thus give lowest ultimate belting cost. Write for informative Data Sheet 54-2 and describe your belting needs.

Imperial BELTING CO.

1755 S. Kilbourn Ave., Chicago 23, Ill.

You expect MORE from Imperial . . . and you get MORE!

Circle 561 on Inquiry Card—Page 255

With the Editors

DELPORT HONORED: The International Committee of Foundry Technical Associations, meeting in Dusseldorf, Germany, during the International Congress, established a new post of honorary treasurer. Vincent Delport, European manager of FOUNDRY and other Penton publications, was elected the first honorary treasurer.

For many years, Vincent has served the foundry industry of England and the Continent. He has been the representative of the American Foundrymen's Society on the International Committee since the early days of the latter organization, and has done much to develop a better understanding of foundry problems on the part of the nations of the world.

Congratulations, Vincent, from the staff of FOUNDRY and from your many other friends here in the United States.

—o—

No Telephone Numbers: In this day and age when so much business is transacted over the telephone, it seems strange that more advertisers do not include telephone numbers in their advertisements. Looking through the October issue I found that many urge the reader to "write or call" for more information, but that only 14 firms have included the telephone number for the benefit of those who prefer to call. Why not make it easier for your customers and potential customers to get in touch with you by giving your telephone number?

—o—

It Takes a Badge: Back in the mid and late thirties, the early AFS chapters were small and most members knew each other. Now many have grown to the point where badges are needed to permit members to get better acquainted. The Northeastern Ohio Chapter recently undertook to provide badges for each member, and the size of the task can be noted from the illustration below. Chairman of the committee, smiling over the completion of the job, is our own Kenneth L. (Rocky) Mountain, associate editor of FOUNDRY. The boards were made by the Aluminum Co. of America, National Malleable & Steel Castings Co., and Cleveland Standard Pattern Works.

—o—

At The Sherman: Our old friend, Alfred Hilbron, at one time exhibits manager of AFS, recently was made assistant director of sales of the Sherman Hotel at Chicago. Al will be glad to see any of his old friends visiting Chicago.

—o—

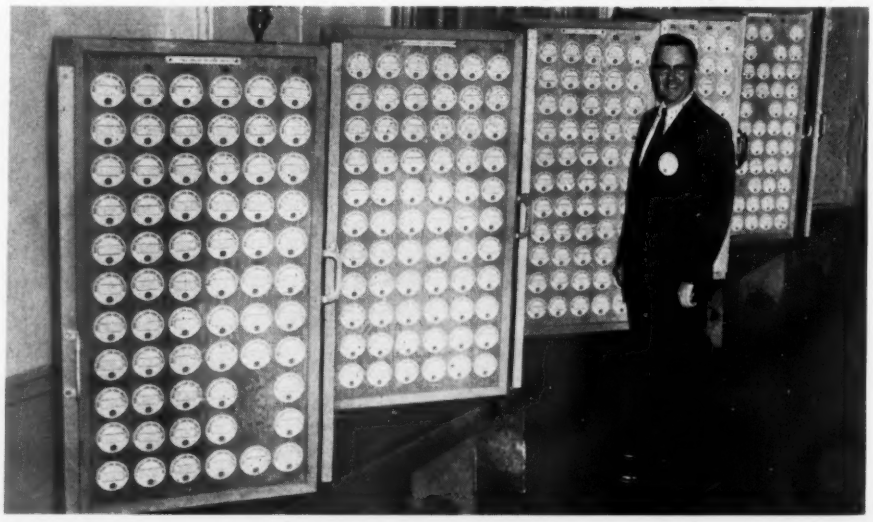
No Time To Read: Charles O. Herb, the able editor of *Machinery*, and a very fine gentleman indeed, had an interesting editorial on "No Time To Read" in an issue earlier in the year. Thought you might be interested.

Most of the knowledge that anyone possesses has been imparted to him by others, either through the medium of the printed page or by word of mouth and actual demonstration. One's own discoveries in a particular line of endeavor are generally founded on knowledge accumulated from the recorded experiences of past and present experts in the same field.

Life is too short for mathematicians to discover for themselves principles that have been accepted since the days of Pythagoras or Euclid—or for inventors to question the effectiveness of the screw, which has been well known since Archimedes—or for philosophers to spend hours on end evolving ideas promulgated in the days of Socrates.

No one can hope to get ahead in his chosen line of work unless he keeps abreast of the

Photo by Harold Wheeler, Allyne-Ryan Foundry Co.



SUPERAY 'A' sets the standards:

Super-sensitive Ansco Film detects flaws of less than 1% of total thickness

Sensitive Ansco Superay 'A' Industrial X-ray Film can actually detect flaws of less than 1% at certain thicknesses. Super-fast, as well, it slashes seconds and minutes from exposing times at low voltages and *hours* from inspection time when using radioactive isotopes. First and still the finest all purpose film tailored to meet the demands of industrial radiography, Superay 'A' has increased its following every year since its introduction. *It's the standard by which all other industrial X-ray films are measured.*

WRITE FOR NEW ANSCO X-RAY PRODUCTS BROCHURE CONTAINING USEFUL TECHNICAL INFORMATION

America's oldest maker of photographic materials... **Ansco**

BINGHAMTON, NEW YORK

A Division of General Aniline & Film Corporation

Circle 562 on Inquiry Card—Page 255

HAUSFELD
FURNACES

FOR GAS
OR FUEL OIL

ARE MEETING EVERY EXACTING
REQUIREMENT

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

HAVE YOU INVESTIGATED THEM
FOR YOUR MELTING PROBLEMS?

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

developments in his field. There is only one way to do that effectively, and that is by reading technical or trade magazines and text-books that cover the particular phase of industry or business in which the individual is engaged. Dependence upon hearsay or casual references is wholly inadequate.

Some people say that they have no time to read the magazines and text-books of their trade or profession. Yet, the time available now for recreation is vastly greater than that of our ancestors who worked ten to twelve hours a day and six days a week. True, there are many more forms of diversion today, such as golf, moving pictures, and television to distract people. But if some of the time ordinarily spent in recreation were devoted to study, in order to increase the capacity to earn a livelihood, it would surely pay large dividends.

While a college education has been available to many more people in recent years than in earlier days, those who have not had the opportunity for advanced formal education need not lack instruction in any line. History books are full of Lincolns, Edisons and Fords who made good in spectacular fashion because they educated themselves. But such records are not only of the past. There are many leading men in public life and industry today who attained their high positions through self-education.

Anyone who does not take time out of his day to improve his professional knowledge by reading is as shortsighted as the woodsman who does not periodically sharpen his axe. No time to read? No one can afford not to read! In the words of Sir Francis Bacon, "Reading Maketh the Full Man."

—o—

Do-It-Yourself: At the Atlantic City convention, Bill Adams, a semi-retired salesman for the Chas. A. Krause Milling Co., showed me a copy of the *Miami Herald* for Sunday, Apr. 15, which carried an illustrated story on how Bill and Meddie Adams completed a do-it-yourself project at Boca Raton, Fla. The Adamses purchased a building of the U. S. Air Force Radar Training School and remodeled it themselves, with some help in plastering and the more intricate architectural details, into a modern 11-unit apartment which is completely filled with a year-around clientele. By the way, Bill would be glad to see any of his many foundry acquaintances if they should be driving through Boca Raton.

—o—

Industry Gift: Albert F. Pfeiffer, superintendent of pattern shops, Allis-Chalmers Mfg. Co., West Allis, Wis. (FOUNDRY for June, page 10) writes us as follows: "It might be of interest to you to know that having received the FOUNDRY magazine for many years, I have kept and filed the different copies, and on Oct. 1, I made arrangements to give these copies, right up to date, to the West Allis School of Vocational and Adult Education of West Allis, Wis., where I am sure they will be a great help to the different students interested in the foundry and pattern industry."

This is a fine gift, Al, and I am sure the school will put these copies to good use.

F.G.S.

Circle 563 on Inquiry Card—Page 255

Circle 564 on Inquiry Card→

'dag' dispersions . . . *a touch does so much!*

'Oildag' vital to continuous molding-machine operation

Production Pattern & Foundry Company of Chicopee, Mass. runs its five shell-molding machines 24 hours a day to keep up with casting-floor demand for molds. To stand up under this tough service, the machines must be properly maintained.

Maintenance personnel at Production Pattern & Foundry have found that lubrication instructions of the machine's manufacturer have paid off handsomely. Shell Process Co., which makes these shell-molding machines, recommends **'Oildag'** — colloidal graphite in petroleum oil — diluted with five parts of No. 10 oil for the lubrication of critical wear points: the axle bearings of the drive mechanism, and hitch-pivots and link pins of the roller chain. Since the roller chain is subjected to 900° F temperatures within the shell-baking oven, conventional lubricants would be useless . . . would decompose and carbonize. Proof of the effectiveness of colloidal graphite for this heavy-duty high-temperature lubrication job is the fact that the machines have operated without breakdown for more than six years!

Dispersions of colloidal graphite are extremely valuable elsewhere in the foundry too: as long-lasting lubricants for moving parts of casting machines and other foundry mechanisms; as heat-resistant ladle coatings, and effective mold coatings for better parting and controlled cooling. You can learn more about the use of **'dag'** dispersions in metal-casting operations through Acheson's Bulletin 425. Write for your free copy today.

100th Anniversary

EDWARD GOODRICH ACHESON 1856-1931

1891—SILICON CARBIDE
1895—SYNTHETIC GRAPHITE
1906—COLLOIDAL GRAPHITE

ACHESON COLLOIDS COMPANY
PORT HURON, MICHIGAN
. . . also Acheson Colloids Ltd., London, England

ACHESON COLLOIDAL DISPERSIONS:
Graphite • Molybdenum Disulfide • Zinc Oxide • Mica and other solids

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ACHESON COLLOIDS COMPANY
Port Huron, Michigan, Dept. J-11

Yes, I want your free bulletin describing **'dag'** Dispersions for Metal-Casting Operations.

Name_____

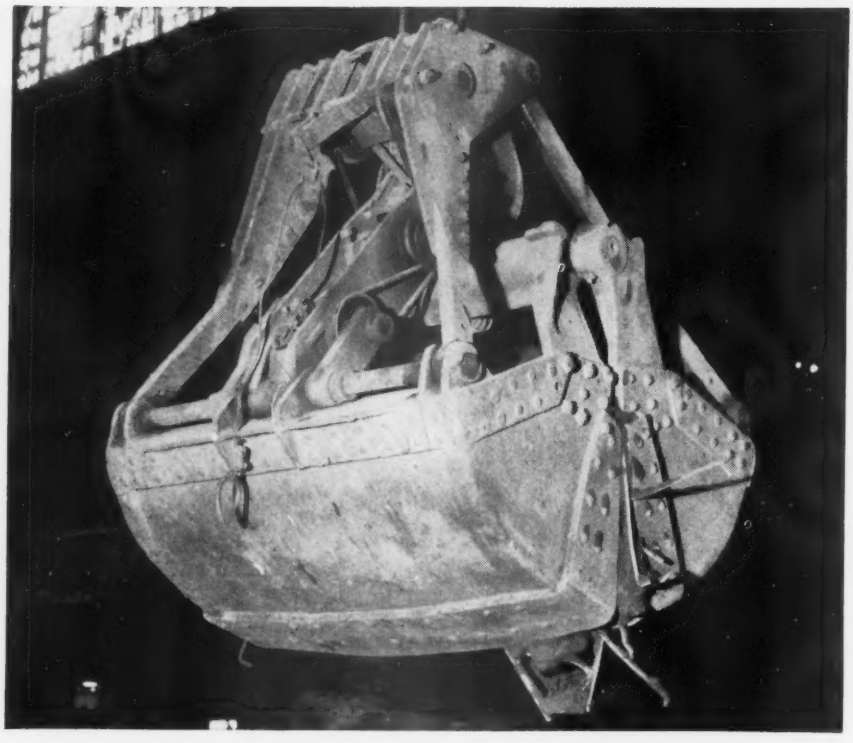
Title_____

Company_____

Address_____

City_____ Zone____ State____

GOOD SERVICE FOR 10 YEARS
FROM OUR
ERIE HOOK-ON BUCKETS



● STATES W. R. HODDER .... UNITED ENGINEERING AND FOUNDRY CO.

Ten years ago, United Engineering and Foundry Co. purchased an ERIE Single-Line, Hook-On Bucket. Their requirements were tough, but fair. They needed a durable, smooth-working clamshell to handle slag—a bucket fully controlled by their crane operator, from his cab.

United Foundry now has four ERIE Hook-On's at their Pittsburgh and Vandergrift, Pa. plants. Bucket No. 1 has required little maintenance, still gives fast operation and full payloads. Their other ERIE buckets are doing fine, too. Looking at the record, W. R. Hodder, Chief Plant Engineer, reports: "Our experience with ERIE buckets has been very satisfactory."

Check the ERIE—feature for feature—against any other hook-on clamshell made!

Plus Features of ERIE Buckets

1. Hooks up and is in operation in less than five minutes. Detaches just as quickly.
2. Extra heavy, balanced clams for equal crowding on both closing edges at all times.
3. Narrow, rigid, one-piece welded head shrugs off jars, eliminates wobble, minimizes maintenance.
4. Lever arm and block and tackle design provides great closing power for full payloads.

ERIE
BUCKETS THE WORLD OVER

Write for Catalogs, Dept. F96

ERIE STRAYER Co.
296 GEIST ROAD ERIE, PENNSYLVANIA

CALENDAR of Meetings

Oct. 31-Nov. 2—Gray Iron Founders' Society, annual meeting, The Homestead, Hot Springs, Va.

Oct. 31-Nov. 2—Industrial Management Society, time and motion study and management clinic, Hotel Sherman, Chicago.

Oct. 31-Nov. 2—Society for Experimental Stress Analysis, annual meeting and exhibit, Deshler-Hilton Hotel, Columbus, O.

Nov. 7-9—Steel Founders' Society of America, technical and operating conference, Carter Hotel, Cleveland.

Nov. 8-9—All-Canadian Foundry Conference, sponsored by Eastern Canada, Ontario and British Columbia chapters of AFS, Sheraton-Mount Royal Hotel, Montreal.

Nov. 13-15—Investment Casting Institute, annual meeting, Sheraton-Cadillac Hotel, Detroit.

Nov. 25-30—American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York.

Nov. 26-30—Third International Automation Exposition, New York Trade Show Bldg., New York.

Nov. 29-30—Michigan Regional Foundry Conference, Union Bldg., University of Michigan, Ann Arbor, Mich.

Dec. 3-5—Air Pollution Control Association, semiannual meeting, Rice Hotel, Houston, Tex.

Dec. 5-7—American Institute of Mining and Metallurgical Engineers, electric furnace steel conference, Morrison Hotel, Chicago.

1957

Jan. 18—Malleable Founders' Society semiannual meeting, Hotel Cleveland, Cleveland.

Jan. 28-31—Plant Maintenance and Engineering Show, Public Auditorium, Cleveland.

Feb. 4-8—American Society for Testing Materials, committee week and spring meeting, Benjamin Franklin Hotel, Philadelphia.

Feb. 7-8—Malleable Founders' Society, 2nd technical and operating conference, Wade Park Manor, Cleveland.

Feb. 14-15—Wisconsin Regional Foundry Conference, Hotel Schroeder, Milwaukee.

Feb. 21-22—Southeastern Regional Conference, sponsored by Birmingham and Tennessee chapters, AFS, Dinkler-Tutwiler Hotel, Birmingham.

Feb. 25-Mar. 1—International Heating & Air-Conditioning Exposition, International Amphitheatre, Chicago.

Mar. 13-14—Foundry Educational Foundation, college-industry conference, Hotel Cleveland, Cleveland.

Mar. 15-16—California Regional Conference, Claremont Hotel, Berkeley.

Mar. 18-19—Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

Mar. 25-29—American Society for Metals, Western Metals Congress and Exposition, Ambassador Hotel and Pan-Pacific Auditorium, Los Angeles.

Apr. 10-11—Malleable Founders' Society, market development conference, Edgewater Beach Hotel, Chicago.

Apr. 12-13—East Coast Regional Conference, sponsored by Metropolitan, Chesapeake and Philadelphia chapters, AFS, Benjamin Franklin Hotel, Philadelphia.

May 6-10—American Foundrymen's Society, 61st annual convention, Cincinnati.

May 20-24—Design Engineering Show, Coliseum, New York City.

June 13-14—Malleable Founders' Society, annual meeting, The Broadmoor, Colorado Springs, Colo.

June 16-21—American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 20-22—Penn State Foundry Conference, sponsored by Pennsylvania State University in co-operation with AFS chapters in New York and Pennsylvania and several independent foundry groups, Pennsylvania State University, University Park, Pa.

Sept. 23-24—Steel Founders' Society of America, fall meeting, The Homestead, Hot Springs, Va.

Sept. 26-28—Missouri Valley Regional Conference, sponsored by St. Louis, Tri-State, and Mo-Kan chapters, AFS, and Missouri School of Mines Student Chapter, Missouri School of Mines and Metallurgy, Rolla, Mo.

When the name is STANDARD SILICA COMPANY, it means everything that's important to your product quality and customer satisfaction. For Standard produces the foundryman's most basic reproduction tool—silica sand. Our name bears this proud mark of approval by the industry because Standard means greatest silica purity and uniformity.

When your mixing formula starts with Standard foundry sand, you always begin with the same *known* quantity, a silica sand that tests 99.7% pure! The result is better molds and cores, better castings, less rejects, less cleanup time. All of which means a more profitable operation for you.

Next time, specify STANDARD when you need silica. It's a name you can rely on.

It costs less to use the best!

BLACKHAWK SILICA SAND

. . . so be sure to specify Blackhawk Silica Sand when you order. Prompt delivery is assured by two major trunk line railways.

STANDARD
Silica Company
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STANDARD SILICA COMPANY

Silica Center of the World

There's a world of difference in flasks!

FREMONT MAGNESIUM SPREADLOCK FLASKS

SAND CANNOT LODGE IN CORNERS

Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps.

LONGER SERVICE

New two-piece male and female stop, inserted above and below the stud bolt, results in tremendous corner strength. Hardened forged steel cams.

LIGHTER, EASIER HANDLING

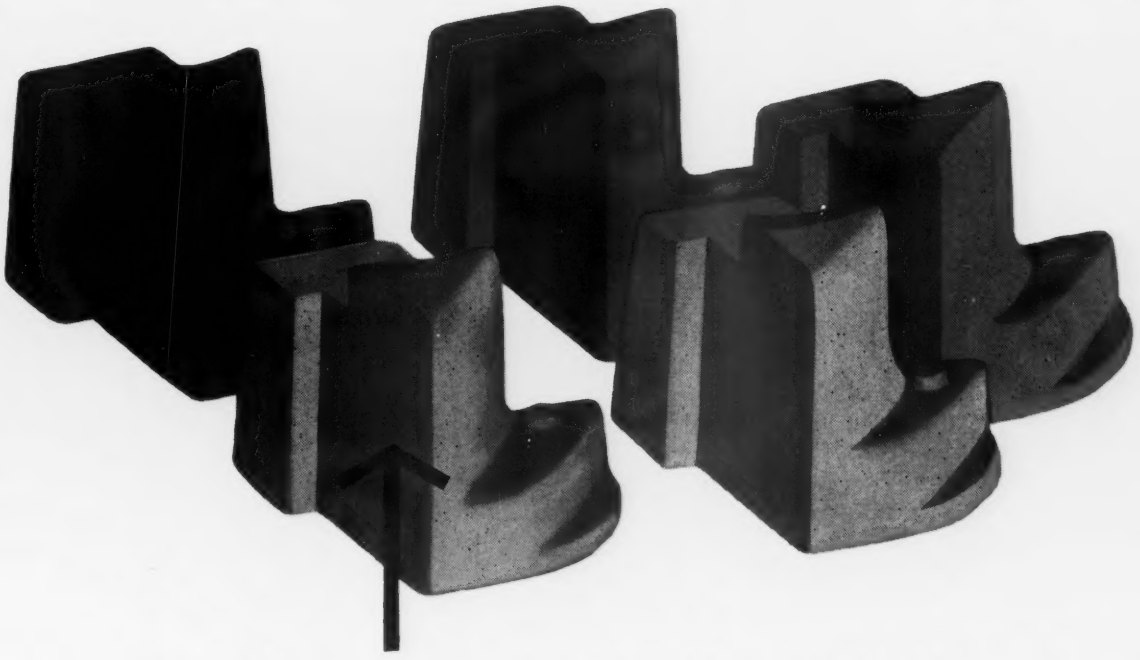
Write today for free literature and prices.

FREMONT CAST IRON OR CAST ALUMINUM JACKETS

New sides or ends easily and quickly inserted. Entire jackets need never be scrapped.

The Fremont FLASK Co.
FREMONT, OHIO

SIPAC T.M. non-carbonaceous core coating—the latest addition to THE UNITED STATES GRAPHITE CO. line



distinctive golden color identifies this highly refractory, low-cost, clean-to-handle coating

Sipac, a new core coating that contains no carbon and gives cores fine smooth surfaces, has just been made available to foundries by The United States Graphite Co. Sipac is a complete formula already in suspension, and needs only the addition of water to the correct Baumé before application (the suspension is so stable that you may dilute it to a Baumé of 32 without settling). A highly refractory material that will not flake off, Sipac completely seals core surfaces and works well with any foundry sand. It anchors to cores exceptionally well, and gives a penetration of 3 to 5 grains with very low cost per covered area. Sipac is clean to handle and its bright golden color makes cores highly visible which is helpful when placing cores in the drag. Sipac is ideal for steel, malleable, and non-ferrous castings as well as gray iron, because it is non-carbonaceous and inert and will not react with any molten metal. Sipac is a concentrated paste which mixes readily with water, and you can apply the diluted wash by swab, dip, brush, or spray methods. Sipac will result in a fine finish for your castings, and you can use this one wash for all jobs. Shipped in 55 gallon drums. Write today for details about Sipac or any of the other United States Graphite Company core or mold coatings.

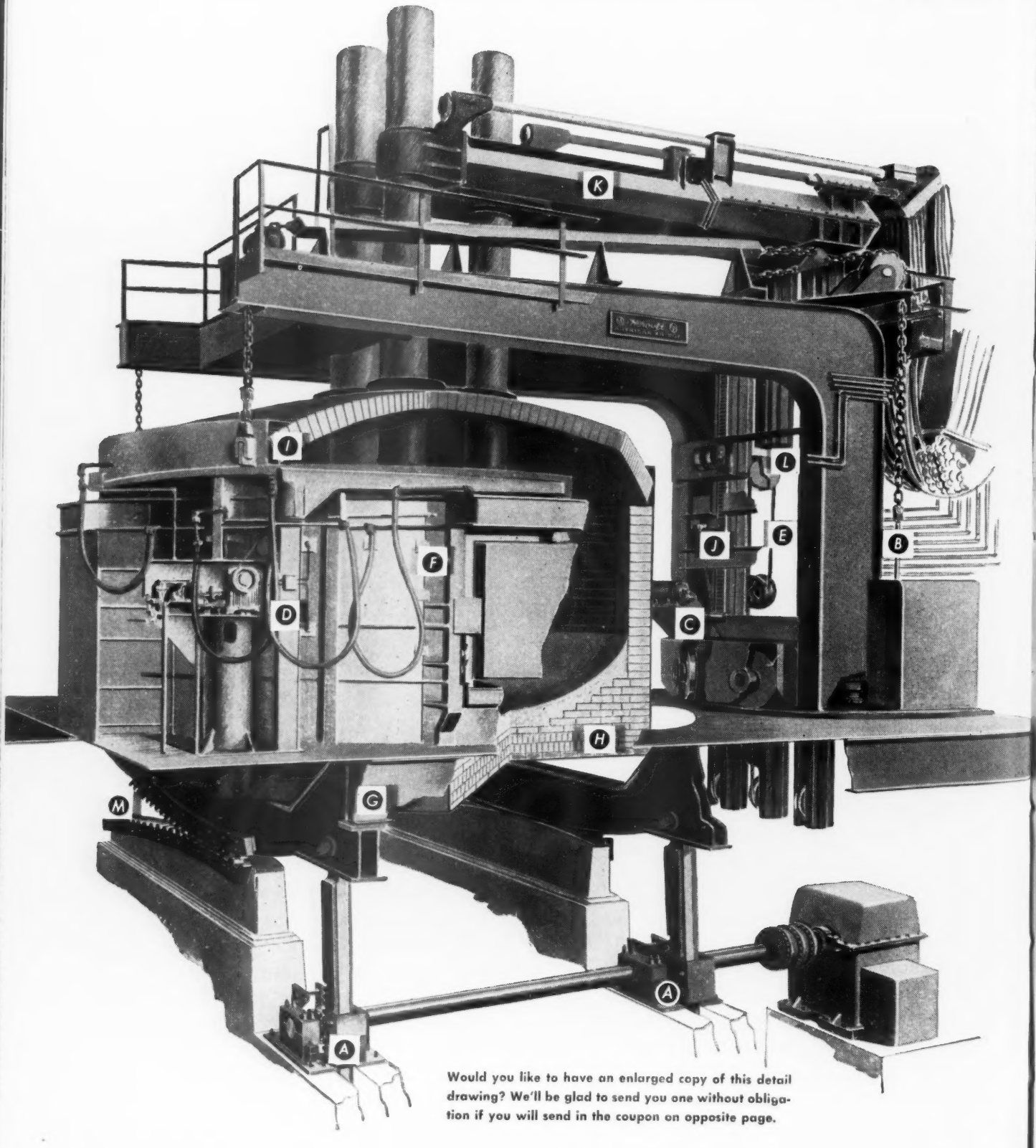
214

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

Circle 569 on Inquiry Card—Page 255

Ten (10) reasons why
is the finest electric furnace

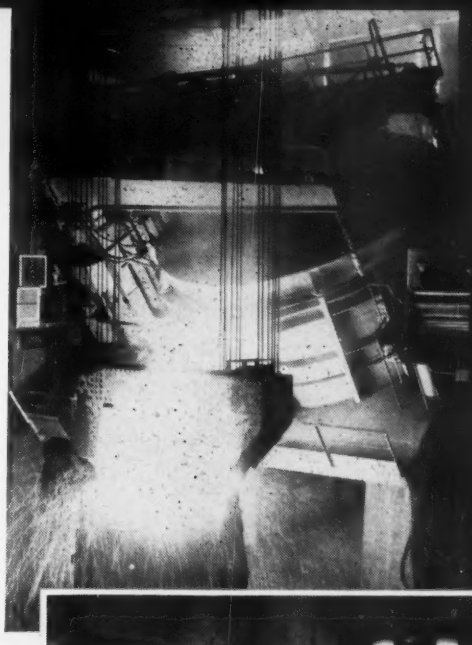


Would you like to have an enlarged copy of this detail drawing? We'll be glad to send you one without obligation if you will send in the coupon on opposite page.

We welcome **an opportunity to help you select and install the Heroult Furnace best suited to your requirements. Remember—*the Heroult we make and install for you will be the finest electric melting furnace that money can buy!***

Circle 570 on Inquiry Card—Page 255

the NEW Heroult on the market!



To HELP YOU PRODUCE better quality steel faster and more economically, we have made important design improvements in the long-famous Heroult electric melting furnace. Five of the features shown in the cutaway drawing at the left and described below are to be found *only* in the new Heroult. *All ten* of the illustrated features are important to those interested in the most modern melting equipment. Any way you look at it—performance efficiency, operating economy, or low-cost maintenance—this *new* Heroult is unquestionably the *finest* electric melting furnace on the market.

1. The Heroult Furnace is *the only 100% mechanically operated electric furnace.*

It includes such mechanical features as: (A) heavy rack-and-pinion-type tilting mechanism, (B) mechanical roof lift, (C) motor-driven, rotating, jib-type roof swing, (D) winch-operated, water-cooled, jib-type door-lifting mechanism, and (E) high-speed, electro-mechanical electrode-positioning mechanism.

2. *Another exclusive* — Cage-type shell construction with shell plates loosely attached (F) to a heavy supporting structure.

This construction minimizes shell warping and allows easy replacement of damaged shell plates.

3. *Exclusive*—Operating mechanism independently supported.

The tilting platform on which all operating mechanisms are supported is attached directly to the rockers independent of the shell structure (G). Thus operating mechanisms are unaffected by any shell distortion.

4. *Exclusive*—Flat Bottom Shell.

This feature (H) facilitates easy shell relining and provides maximum protection against burnouts. Thicker refractory at the sides of the hearth promotes more uniform bath temperature.

5. *Exclusive* — Water-cooled, Skew Back Roof Ring.

This feature (I) eliminates the need for special skew-shaped roof refractories.

6. Electrode Mast Safety Device.

This spring-loaded, rack-and-pawl-type device (J) provides positive protection against damage resulting from electrode winch cable breakage.

7. Square-Section, Water-Cooled Electrode Mast Arms.

This design (K) guarantees a rigid connection between mast and mast arm, thus helping to maintain proper electrode position.

8. Remote-Controlled Electrode Clamps.

This device, of the spring-clamp, air-release type, is located inside of the rear section of the water-cooled mast arm where heat cannot affect it.

9. Square-Sectioned Electrode Mast.

This design feature (L), developed by American Bridge, assures proper guiding and electrode positioning.

10. Rockers.

The heavy fabricated steel curved top and bottom rockers (M) minimize forward travel during tilting. These rockers are so designed that the furnace will tend to return to horizontal position from any degree of tilt.

THE NEW

Heroult

ELECTRIC FURNACES

are available in:

—sizes of shell diameter ranging from 7′ 0″ up, and with capacities of from 6,000 lbs. up to 400,000 lbs. and greater. They are equipped with roof-removing mechanism to permit fast top charging. They can readily be furnished with a non-magnetic shell bottom section to accommodate induction-stirring equipment.

Gantry-type top-charge furnaces, door-charge furnaces, and special furnaces for duplexing and non-ferrous melting can also be supplied.

Heroult

ELECTRIC MELTING FURNACES

Send coupon for catalog and/or enlarged copy of detail drawing with special installation and engineering data.

American Bridge Division
525 William Penn Place, Dept. FO-116
Pittsburgh 30, Pa.

Please send me a copy of the latest Heroult Electric Furnace catalog ( ) and/or your new folder showing large drawing with special installation and engineering data ( ).

Name ..... Title.....

Firm Name .....

Address .....

City ..... State.....

AMERICAN BRIDGE DIVISION

UNITED STATES STEEL CORPORATION, GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

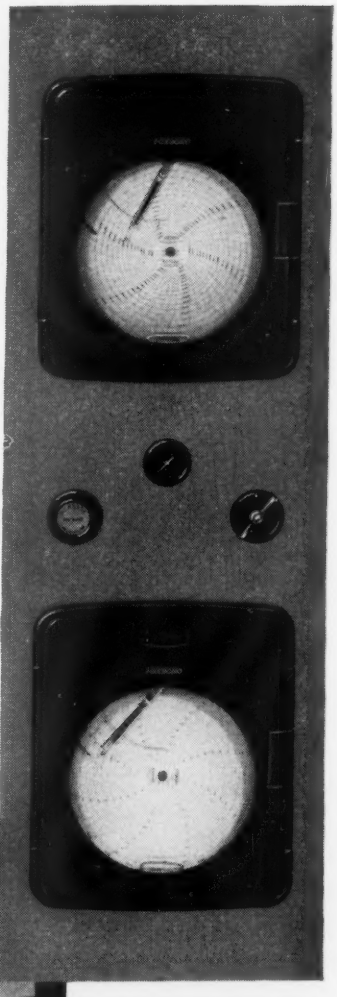
Contracting Offices in New York, Philadelphia, Chicago, San Francisco, and other principal cities.

United States Steel Export Company, New York

UNITED STATES STEEL

Improves Any Cupola's Performance . . . Automatically!

Foxboro Air Weight Control . . .

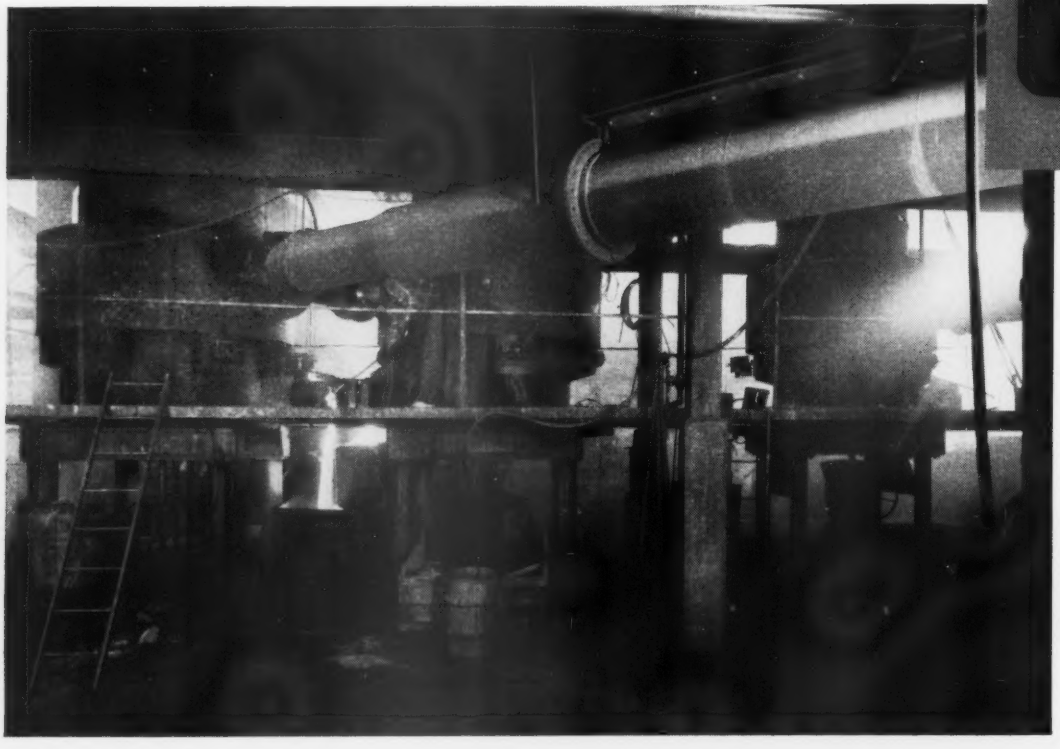


More than 1500 successful applications prove it! Foxboro Air Weight Control *automatically* assures higher, more uniform temperatures . . . whether it's on a small, hand-charged unit, or a continuous hot blast melting system.

Here's why. The Foxboro Air Weight Controller automatically "weighs" air for the cupola blast . . . corrects for atmospheric changes. Coke charge always gets the right amount of oxygen for best combustion, regardless of the weather. The pay-off is faster, more uniform melting . . . higher quality castings day after day. What's more, there's a substantial fuel saving, and practically *no* pigging!

Whether *your* cupola is simple or highly mechanized, Foxboro Air Weight Control is fundamental to its top performance. For full details, write for Application Engineering Data Sheet, or contact a Foxboro Sales Engineer.

Modern Foxboro Cupola Control Panel includes, in addition to Air Weight Controller, a Foxboro Windbox Pressure Recorder which charts cupola conditions . . . permits operator to quickly correct for changes.



In typical installation (left), two Foxboro Air Weight Controllers regulate blast from two Spencer Blowers. Blowers supply one #3, and two #6 Whiting Grey Iron Cupolas.

THE FOXBORO COMPANY, 3211 NEPONSET AVENUE, FOXBORO, MASSACHUSETTS, U. S. A.

FOXBORO
REG. U. S. PAT. OFF.

AIR WEIGHT CONTROLLERS

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

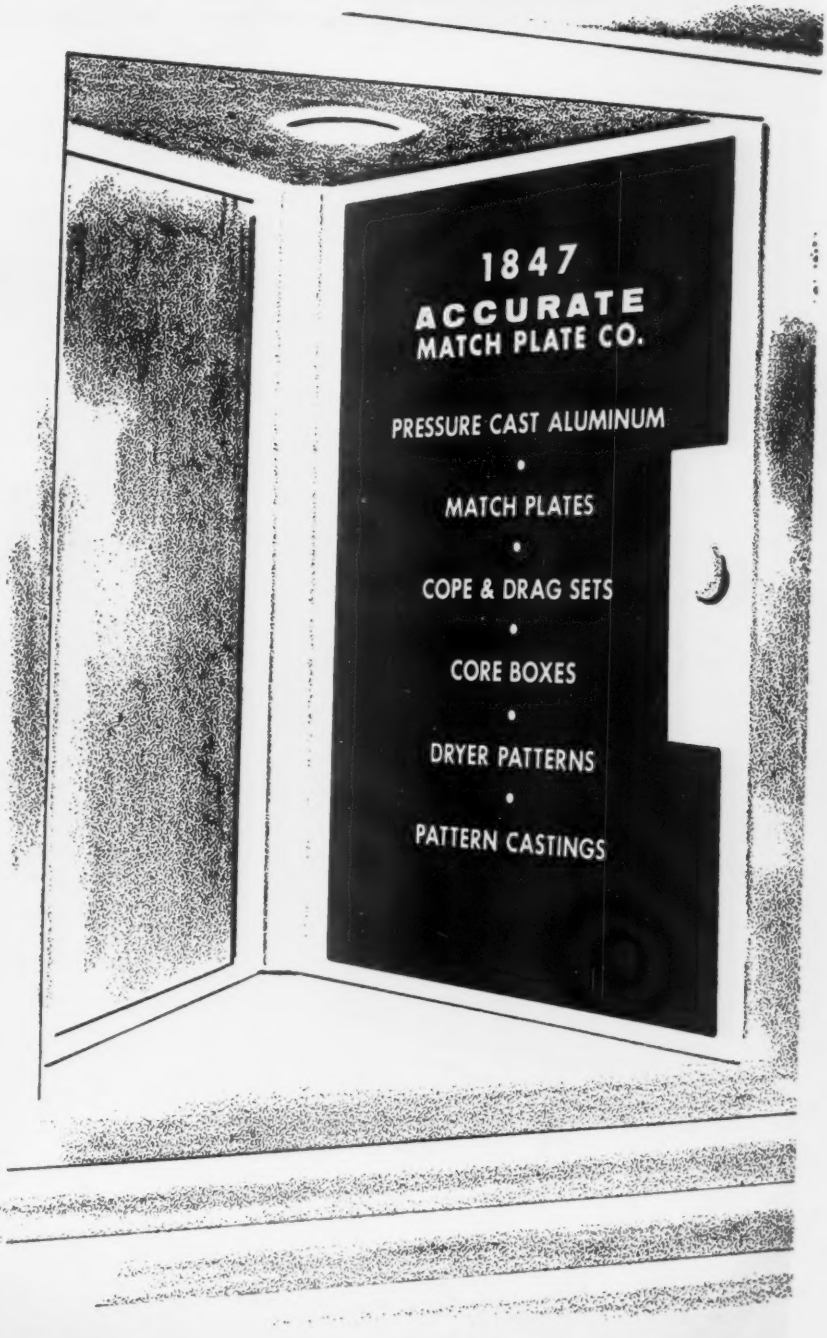
Open the Door to Greater ACCURACY

AREA REPRESENTATIVES

AUBURN, MASS.
Henry A. Kottmann
Telephone: Terrace 2-2683

MILWAUKEE, WIS.
John M. Donohue
Telephone: Hilltop 2-7130

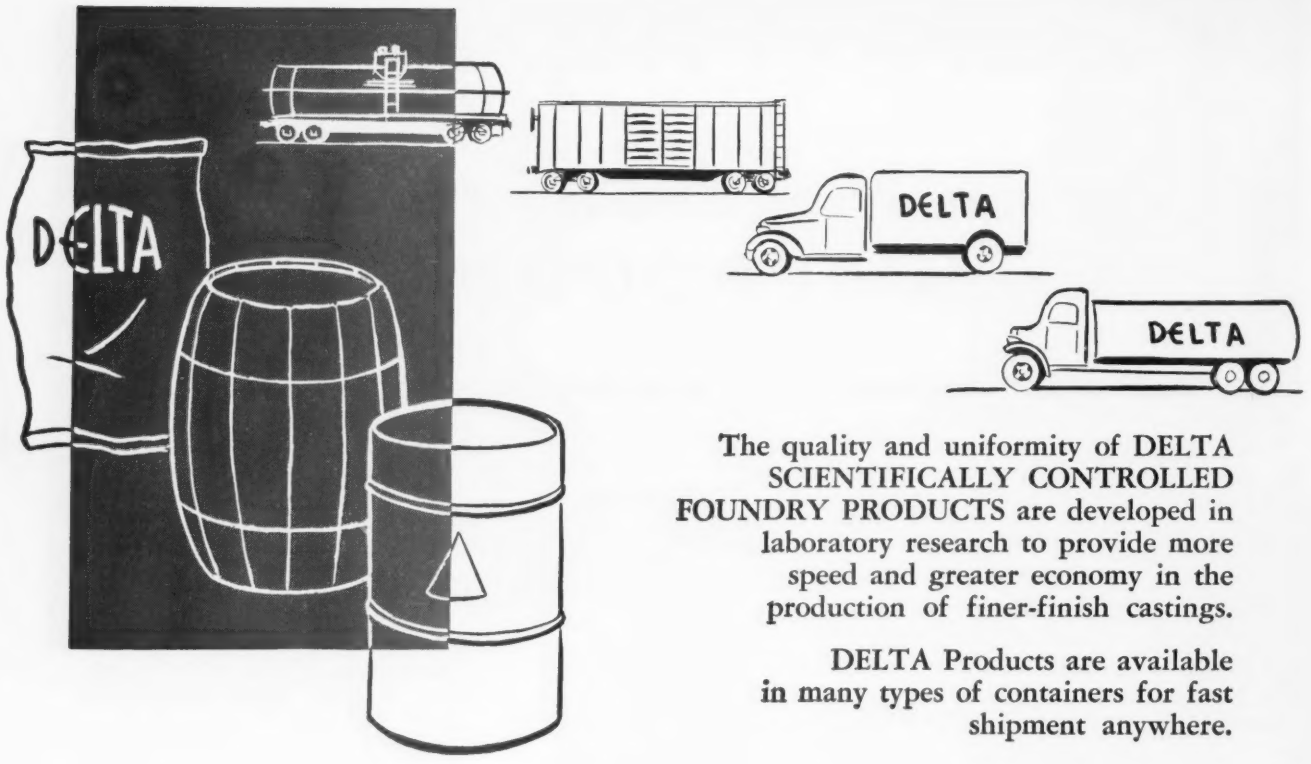
LOS ANGELES, CALIF.
McGowan Company, Inc.
Telephone: Angelus 3-7575



WRITE FOR PRICE SHEET

ACCURATE MATCH PLATE CO.
1847 W. CARROLL AVE. • CHICAGO 12, ILLINOIS

Circle 572 on Inquiry Card—Page 255



The quality and uniformity of DELTA SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS are developed in laboratory research to provide more speed and greater economy in the production of finer-finish castings.

DELTA Products are available in many types of containers for fast shipment anywhere.

There is a DELTA foundry product to solve your foundry problem

CORE AND MOLD WASHES:

FOR STEEL:

*Special Core and Mold Wash Base
*SteelKoat
*PyroKoat-S
*SuperKoat
*ThermoKoat
*Z-Koat
*ZZ-Koat

FOR ALL TYPES OF SAND CAST METALS:

*ThermoKoat
*SuperKoat
*Z-Koat
*ZZ-Koat

FOR GRAY IRON AND MALLEABLE:

*GraKoat
*BlacKoat
*SuperKoat
*BlacKoat C-2
*BlacKoat C-4
*DriKoat B-3
*DriKoat B-5
*BlacKoat S-5
*PyroKoat-S
*PyroKoat-G

FOR NON-FERROUS METALS:

*NonferrusKoat
*SuperKoat
*GraKoat
*DriKoat-F

•

PARTING COMPOUNDS:

*Partex
*Super Partex
Liquid Parting
Liquid Parting Concentrate 113XX

•

MUDDING & PATCHING COMPOUNDS:

*Sliktite
*Ebony

•

MOLD SEAL COMPOUNDS

•

***NO-VEIN COMPOUND**

•

SPRAY BINDERS — LIQUID

•

***DRI-BOND**

•

BONDITE

•

CORE ROD DIP OIL

•

CORE OILS

•

LIQUID RESINS AND BINDERS:

155-X Fast-Dri
168-X Fast-Dri

•

FOR SAND:

*Permi-Bond (Sea Coal Replacement)
*Sand Conditioning Oils
*96-B Sand Release Agent

•

FOR SHELL MOLDS:

DELTA-Dietert Process Binder 103XX
(For "D" process shell cores.)

DELTA

A Foundry First — *by Delta.

Get the Facts...

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

Circle 573 on Inquiry Card—Page 255

Circle 574 on Inquiry Card→

a good turn

for large metal patterns

This big Bullard Turning Lathe is an unusual piece of equipment to be found in a pattern shop . . . its normal habitat is the production line where volume output offsets its investment. At City Pattern it is used to machine large metal patterns because it provides accuracy at maximum economy of time and money.

This is another indication of the unusual facilities to be found at City Pattern Foundry & Machine Co. for the crafting of the finest in metal patterns and other foundry equipment. Such facilities, manned by experienced hands, are your assurance that a pattern bearing this name has been produced accurately and by the most practical and economical modern methods. These "stand-out" facilities, coupled with conscientious effort to produce the best in patterns, are the very reasons that leading manufacturers rely on City Pattern Foundry & Machine Company for patterns that stand out in use.

City Pattern Foundry & Machine Company's Shrinkage Conversion Tables save time and eliminate errors in shrinkage calculations. Your letterhead request will bring a set of these handy tables without obligation.

Setting the Pattern in Patterns

CITY PATTERN

FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE • DETROIT 11, MICHIGAN

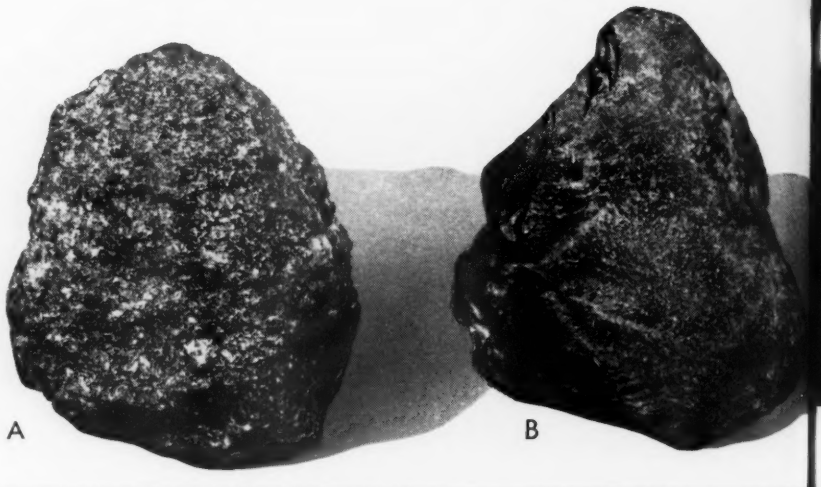
Great news for foundries!...The NEW

44 ALUNDUM abrasive

...most sensational non-premium abrasive ever developed...with new "TOUCH of GOLD" benefits for better, lower cost snagging

Different in every way!

New 44 ALUNDUM abrasive (B at right) *looks different* from ordinary aluminum oxide abrasive (A), with a finer grained surface that denotes greater density and toughness. That's because it's *made differently*, by a special Norton-developed electric furnace process. And that's why it *performs differently*, with new time-and-money-saving advantages.



Big news about the new 44 ALUNDUM abrasive is this:

For a non-premium priced abrasive its performance and service life are truly outstanding.

It's a real work-horse abrasive — with extra ruggedness and durability that can take on a lot of tough snagging jobs and come back for plenty more.

This has been proved in more than 1100 tests. Plants all over the country — foundries among them — have reported that 44 ALUNDUM wheels have these advantages over the standard aluminum oxide wheels they previously used: *Longer life • cooler cutting • faster rate of cut • better finish • more work per wheel.*

Foundries also report that operators are especially pleased with the new 44 ALUNDUM wheels — with the easy-handling, work-hugging qualities that reduce fatigue and cut time and effort.

Straight Facts

On any job where other non-premium priced aluminum oxide abrasive wheels are good, the new 44 ALUNDUM wheels will give results ranging from at least equal to very much better.

They'll step up your cleaning room operations, and cut snagging costs.

Take advantage of this outstanding new abrasive value. See your Norton Distributor about arranging test runs of new 44 ALUNDUM wheels in your foundry. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

Your latest Norton-Engineered "Touch of Gold"

New 44 ALUNDUM wheels are the toughest, most efficient and economical ever made for snagging. On all types of machines they grind faster and last longer. On your portables and swing frames their built-in balance makes them "hug that work" closer, with less vibration and bounce.

Made with the B11 resinoid bond they'll take the heaviest pressures — and push more metal through your cleaning room per man-hour. New 44 ALUNDUM wheels are available — *now* — in all popular bonds and wheel types, and in sizes ranging from mounted wheels to largest floor stand wheels.

W-1746

NORTON

ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories

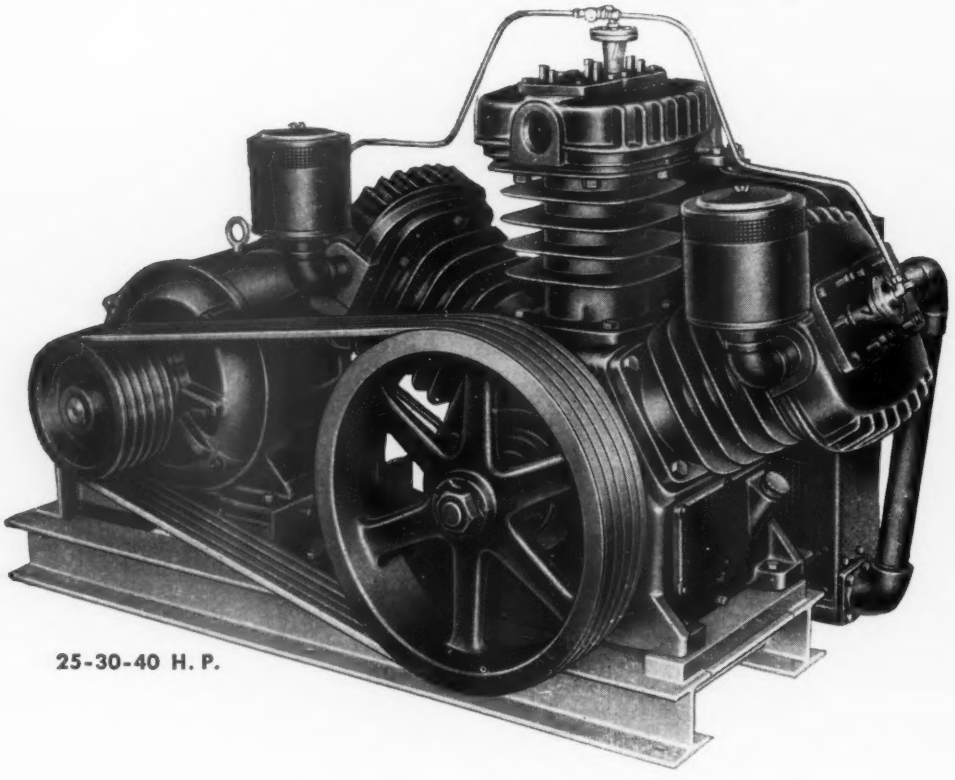
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

Circle 575 on Inquiry Card—Page 255

THE NEW CURTIS MODEL C-100
TWO-STAGE, AIR-COOLED AIR COMPRESSOR

Provides Higher Operating Efficiency
Costs Less to Install



25-30-40 H. P.

THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

For complete information write for illustrated folder.

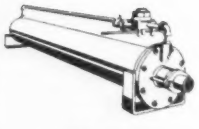
Remember, you can count on . . . OUR 102nd YEAR

Curtis

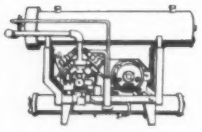
MANUFACTURING COMPANY • PNEUMATIC DIVISION

1922 KIENLEN AVE. • ST. LOUIS 20, MO.

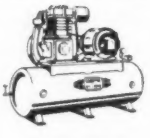
CM-6



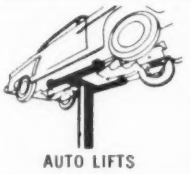
AIR HOISTS
AIR CYLINDERS



PACKAGED LIQUID CHILLERS



AUTOMOTIVE AIR COMPRESSORS



AUTO LIFTS

PACKAGED AND REMOTE AIR CONDITIONING

more power . . . . . for foundry sand

Nichols
Sand
Reclamation
Systems

Get more mileage from your foundry sand with a Nichols Reclamation System that permits you to use—and reuse—sand by returning it to good-as-new condition.

Are you interested in Zircon sand for shell molding? Nichols Equipment is now used or under construction for reclamation of Zircon Shell Molding Sand, Juniata Bank Shell Molding Sand . . . Steel, Gray Iron, Aluminum and Magnesium Foundry Sands.

Nichols equipment and engineering services reflect more than 60 years of experience in thermal processing and more than 15 years of experience in the reclamation of Foundry Sand. Complete laboratory facilities are available to our clients.

Write for Bulletin No. 222

NICHOLS
Engineering & Research Corp.
70 PINE ST., NEW YORK 5, N. Y.
1637 N. Illinois St., Indianapolis 2, Ind.
1477 Sherbrooke St. W., Montreal 25, Canada

Circle 577 on Inquiry Card—Page 255

YOU'LL DO A BETTER JOB

with **H. V. ADAMS DESIGNED**

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

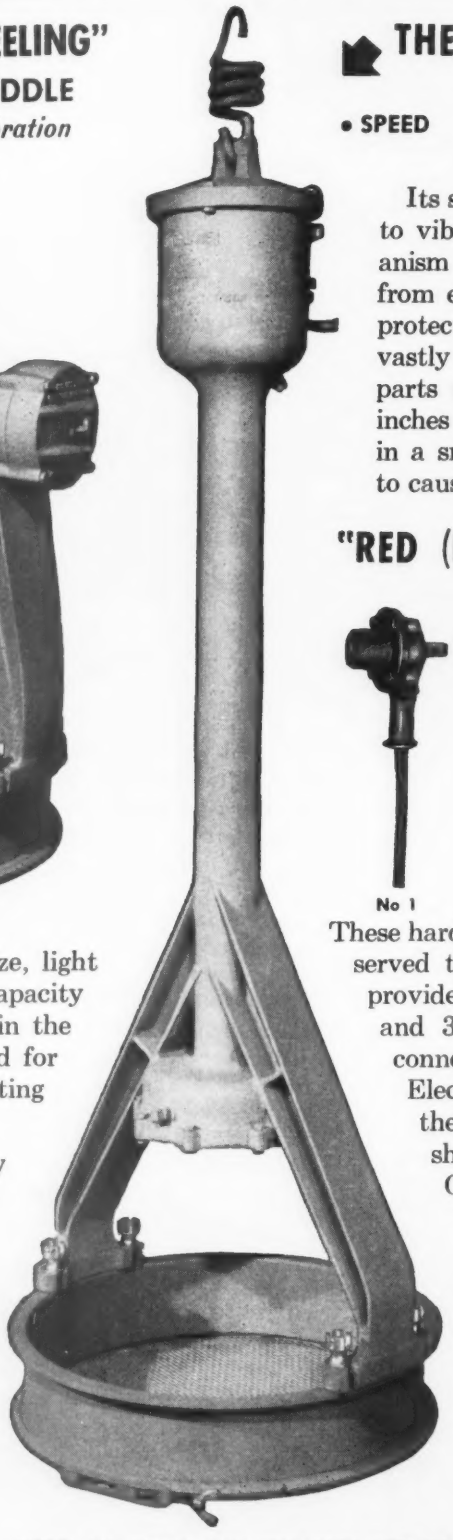
with the Double Eight Vibration

Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



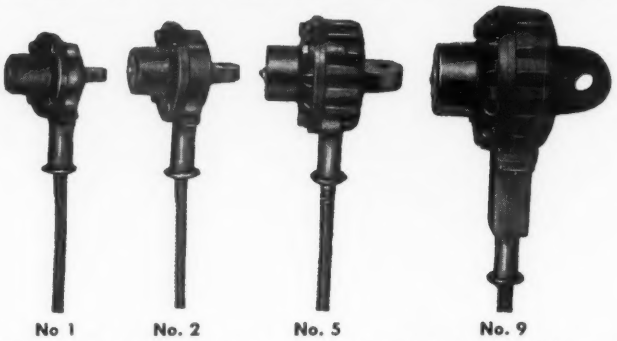
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

- **SPEED**
- **ECONOMY**
- **SAFETY**
- **LONGER LIFE**
- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

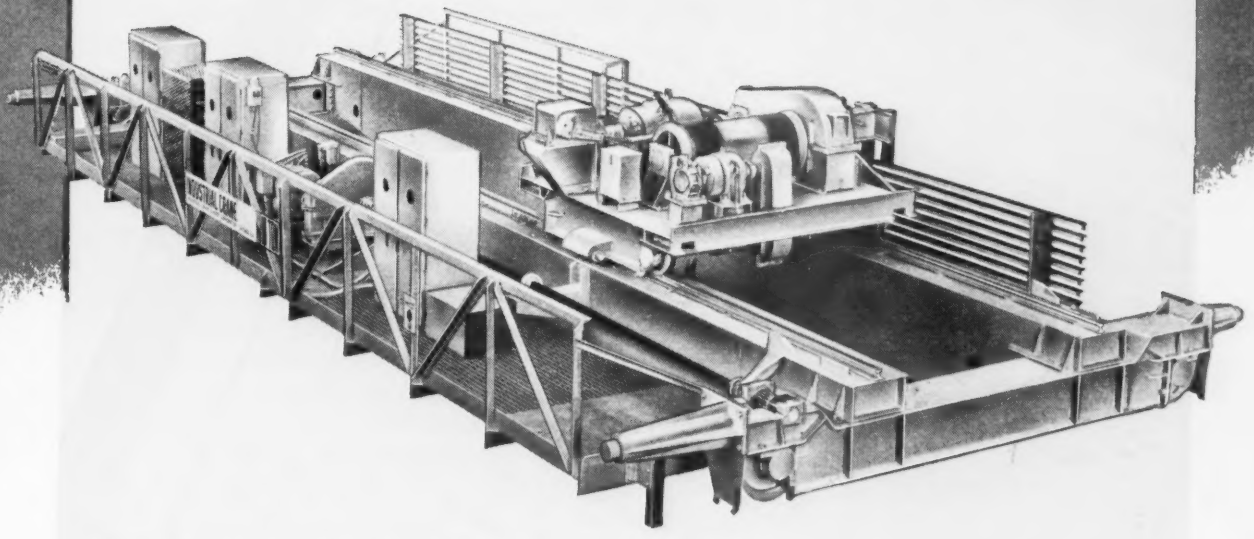
ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**

Industrial STANDARD HEAVY DUTY CRANES are TODAY'S BEST VALUE



Standard Industrial Heavy Duty Crane Span 46'0", Capacity 10 tons with full magnetic control for heavy duty service in a foundry. Other models available in capacities up to 100 tons.

Practical design plus high quality modern components combine to make *Industrial* Heavy Duty Cranes today's best value. Ease of maintenance is designed into every section of this efficient crane. Safe accessibility to all working parts insures top performance with lowest cost. Consult with Industrial Crane and Hoist engineers for your next crane.

Industrial CRANES

Designers and Builders of Overhead Cranes, Jib Cranes, Gantrys and Monorail Systems.

INDUSTRIAL CRANE & HOIST

Ingersoll PRODUCTS DIVISION

BORG-WARNER CORPORATION

1541 SOUTH PAULINA STREET • CHICAGO 8, ILLINOIS

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EXPORT SALES
BORG-WARNER INTERNATIONAL
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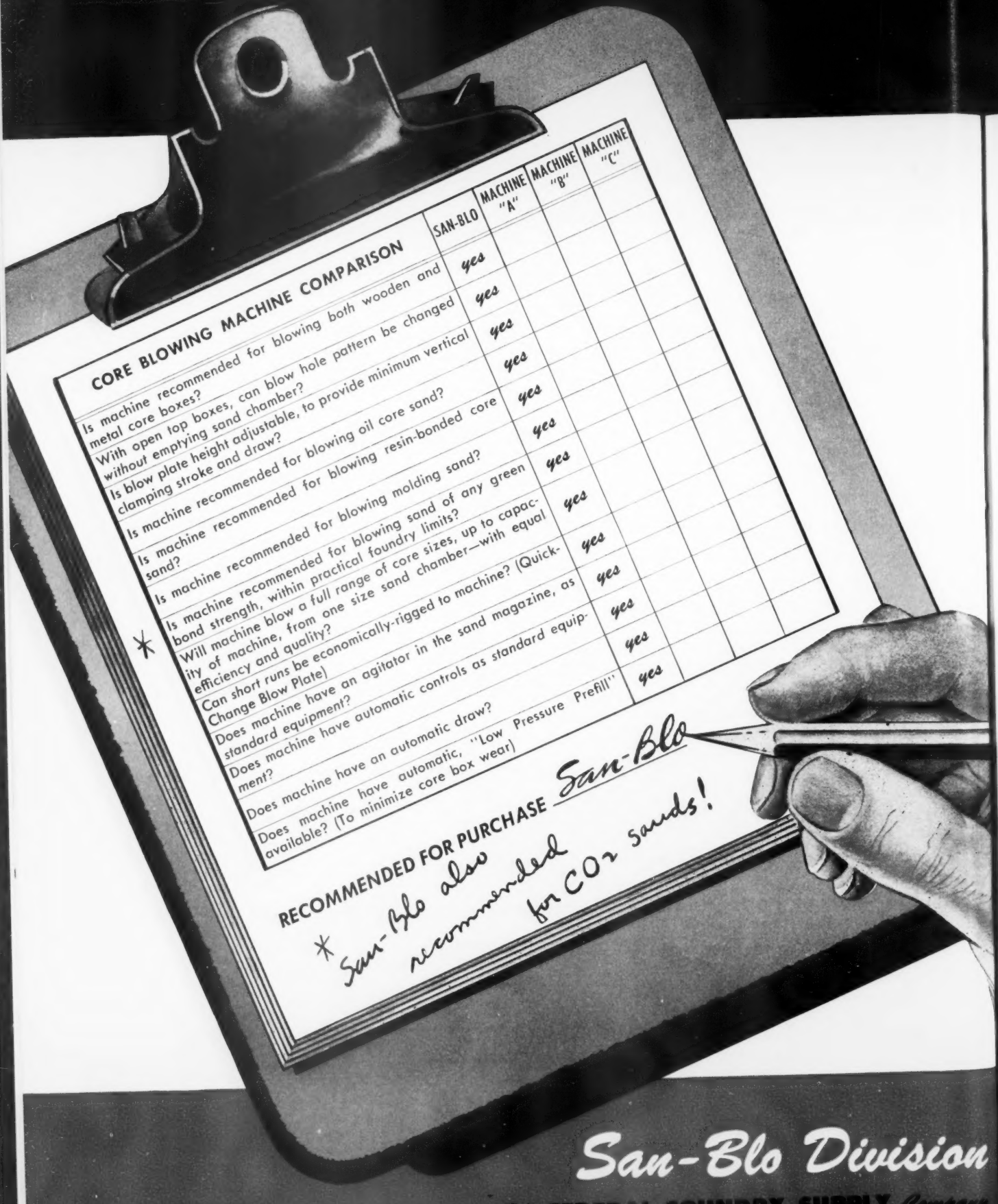
36 SO. WABASH AVE.
CHICAGO, ILLINOIS

HD 856-C

Circle 579 on Inquiry Card—Page 255

MORE VALUE FOR YOUR MONEY W



CORE BLOWING MACHINE COMPARISON

	SAN-BLO	MACHINE "A"	MACHINE "B"	MACHINE "C"
Is machine recommended for blowing both wooden and metal core boxes?	yes			
With open top boxes, can blow hole pattern be changed without emptying sand chamber?	yes			
Is blow plate height adjustable, to provide minimum vertical clamping stroke and draw?	yes			
Is machine recommended for blowing oil core sand?	yes			
Is machine recommended for blowing resin-bonded core sand?	yes			
Is machine recommended for blowing molding sand?	yes			
Is machine recommended for blowing sand of any green bond strength, within practical foundry limits?	yes			
Will machine blow a full range of core sizes, up to capacity of machine, from one size sand chamber—with equal efficiency and quality?	yes			
Can short runs be economically-rigged to machine? (Quick-Change Blow Plate)	yes			
Does machine have an agitator in the sand magazine, as standard equipment?	yes			
Does machine have automatic controls as standard equipment?	yes			
Does machine have an automatic draw?	yes			
Does machine have automatic, "Low Pressure Prefill" available? (To minimize core box wear)	yes			

* RECOMMENDED FOR PURCHASE San-Blo

* San-Blo also recommended for CO_2 sands!

San-Blo Division

The FEDERAL FOUNDRY SUPPLY Company

4600 EAST 71st STREET • CLEVELAND 5, OHIO

CHICAGO • DETROIT • LOS ANGELES • MILWAUKEE • NEW YORK

Circle 580 on Inquiry Card—Page 255

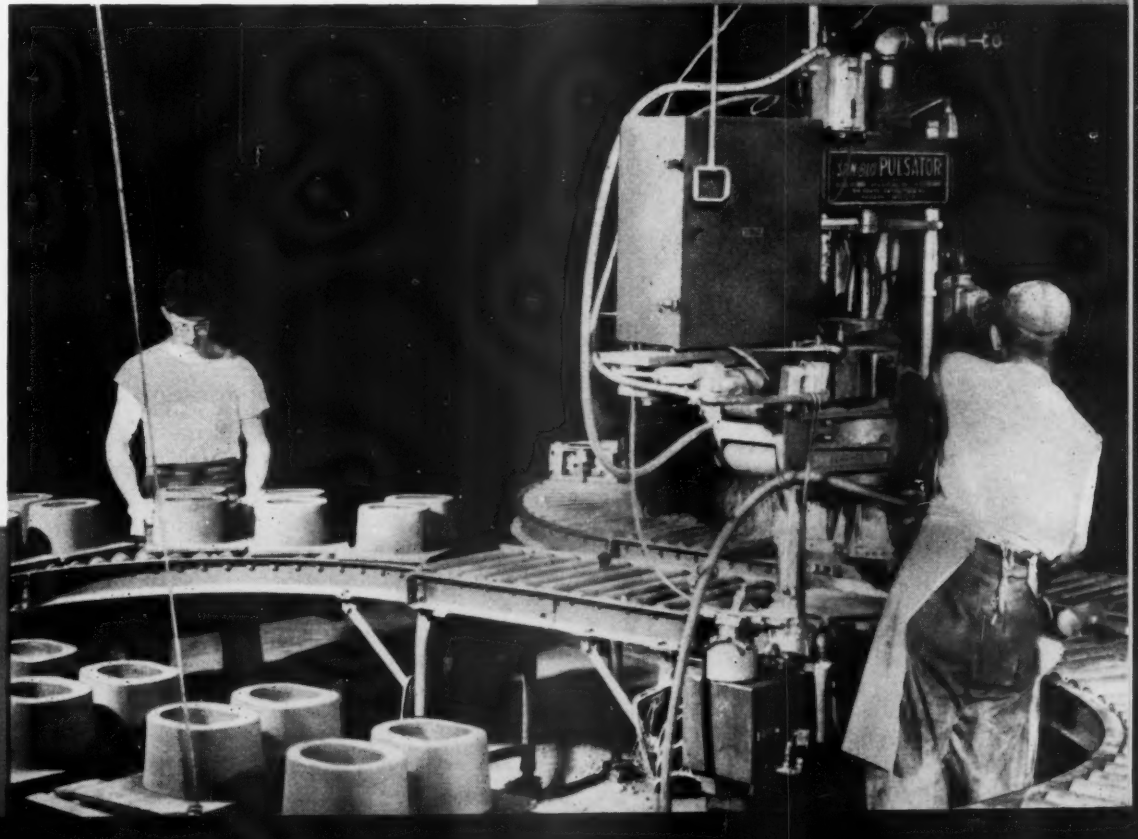
Y WITH SAN-BLO

When it comes to deciding *which* core blower to buy—you've got to look *beyond* the investment involved. You should check closely into the *advantages* and *versatility* offered by the machines you're considering and compare essentials provided as *standard equipment.*

Then, and only then, can you get a true line on *what you're going to get* for your core blowing dollars. The comparison chart on the opposite page should be very helpful to you in arriving at a decision. Answers to important core blowing questions are filled in for the SAN-BLO and space provided for other machines you may be considering. *This honest evaluation of machine merit will lead to your purchase of the* SAN-BLO!

Additional information on the SAN-BLO, for further comparison, is available on request. Or, let us know if one of our field engineers can be of assistance. Write to the SAN-BLO Division, The Federal Foundry Supply Company, 4600 East 71st Street, Cleveland 5, Ohio.

A model "250" SAN-BLO in a production foundry, blowing cores weighing up to 250 lbs. each.



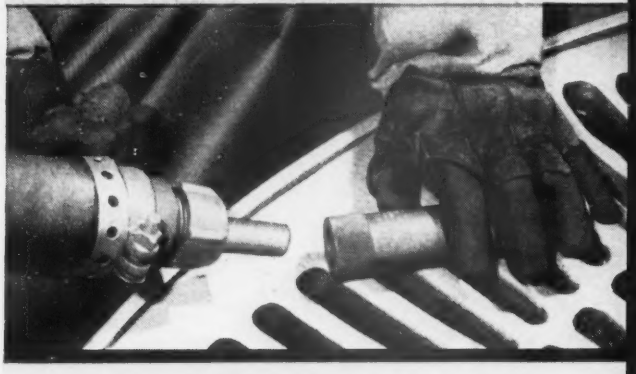
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

model "4C" SAN-BLO in a steel ... blowing runner cup cores.

BLAST!

BIG ones like this

or small ones, too! . . . . .



. . . . More Economically with

Norbide® Pressure Blast Nozzles

THERE'S a NORBIDE Nozzle available to give you exactly the type of cleaning stream you need — from a broad stream for large areas to a pencil-thin stream for cleaning small openings. And NORBIDE Nozzles — lined with the hardest manufactured material commercially available — maintain stream contour, last longer than any other nozzle made and deliver maximum blasting efficiency at minimum cost per hour.

For full details on cost-cutting NORBIDE Nozzles, write for your free copy of Form 543.

NORTON COMPANY
43 New Bond St., Worcester 6, Mass.

NORTON®
BORON CARBIDE

NORTON PRODUCTS: Abrasives • Grinding Wheels
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BEHR-MANNING PRODUCTS: Coated Abrasives
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NORBIDE®. . . . The Longest Nozzle Life You Can Buy

Late News

THE BUSINESS SCENE: Home builders expect housing starts to drop 10 per cent next year, largely because of the financing situation, according to the National Association of Home Builders . . . Oil industry expenditures for domestic expansion in 1956-57 should reach $10 billion.

The highway program in 1957 is estimated to cost $6.4 billion and should reach $8.8 billion by 1960. Not only will this accelerated program require a lot of materials and equipment, but commercial and industrial expansion along the new highways also will involve heavy expenditures, much of it in metalworking fields.

The Investment Casting Institute predicts 1956 sales of $160 million of investment castings. This figure is up $25 million from 1955 and $65 million from 1953 . . . Freight cars on order at the end of September totaled 122,421, compared with the high of 147,320 last December and only 449 fewer than at the end of August.

U. S. Department of Commerce estimates that dollar volume of orders among metal fabricators is 17 per cent higher than a year ago. Gains are placed at 29 per cent for machinery manufacturers and 25 per cent for transportation equipment builders.

QUITS MERCHANT TRADE: Bethlehem Steel Co. has announced it will withdraw permanently from the merchant pig iron trade next Jan. 1. It expects to have present commitments cleaned up by then. The decision affects all foundry grades, but not ferromanganese. Another factor influencing eastern pig iron supply is Alan Wood Steel Co.'s withdrawal from the market in anticipation of a five-months' shutdown starting Jan. 1 of its smaller blast furnace at Swedeland, Pa. The stack will be enlarged and rehabilitated.

FEMA ELECTS OFFICERS: D. E. Davidson, Link-Belt Co., Chicago, was re-elected president of the Foundry Equipment Manufacturers Association at its 38th annual meeting, Oct. 18-20. G. E. Seavoy, Whiting Corp., Harvey, Ill., was re-elected vice president, and C. R. Heller will continue as executive secretary-treasurer. New directors for three years are Leon Miller, Osborn Mfg. Co., Cleveland; C. V. Nass, Beardsley & Piper Division, Chicago; W. O. Vedder, Pangborn Corp., Hagerstown, Md.

SCRAP STRONGER: Prices of ferrous scrap have firmed moderately after a brief downward trend. The stronger tendency in steel scrap is supported by the good outlook in steelworks operations. Cast grades in most areas are holding at several dollars a ton below levels prevailing a month ago. Exports from the West Coast continue active.

NEW FIRM: Consolidated Foundries & Mfg. Corp., Chicago, has formed Michigan Industries Co., a wholly owned subsidiary with headquarters in Detroit. Five divisions of the subsidiary include Michigan-Standard Alloy Casting Co., Misco Fabricators, M.S. Machine Products Co. and Waimet Alloys Co., all of Detroit, and Western Foundry Co., Holland, Mich.

OBITUARY: Charles Reymann Sr., 86, board chairman, Atlantic Foundry Co., Akron, O., died Oct. 11 . . . Irving H. Tolles, 73, former vice president, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., died Sept. 22 . . . William J. Brennan Sr., 76, president, Geneva Foundry Corp., Geneva, N. Y., died Sept. 22 . . . N. M. Marsilius, 66, chairman, Producto Machine Co., Bristol, Conn., died Oct. 17.

PERSONALS: Hyman Rosenthal is new director of research for Arwood Precision Casting Corp., New York . . . J. J. Punke has been made executive vice president of Precision Castings Division of Harsco Corp., Syracuse, N. Y. . . . Hillard M. Patton, formerly foundry superintendent, now is manager of the new Foundry Division, American Hoist & Derrick Co., St. Paul . . . John Stobbs has been advanced from metallurgical engineer to administrative manager of foundry, Light Metals Division, Thompson Products Inc., Cleveland . . . William J. White has been appointed plant

manager of Carver Foundry Inc., Fairview Village, Pa. . . . Alfred C. Quist has been named vice president of E. J. Machine & Pattern Corp., West Springfield, Mass., an affiliate of Production Pattern & Foundry Co., Chicopee, Mass. . . . John G. Schaeffer, foundry superintendent at Vernon, Calif., General Metals Corp., has been transferred to manager of manufacturing at General's Oakland foundry . . . Frank G. Hough, founder and president, the Frank G. Hough Co., Libertyville, Ill., has been made chairman. He is succeeded as president by G. A. Gilbertson, formerly executive vice president and general manager.

NONFERROUS CASTINGS SHIPMENTS: August shipments of nonferrous castings totaled 197 million pounds compared with 160 million pounds in July and 219 million pounds in August 1955. Shipments of copper and copper-base alloy castings for August were 77,619,000 lb; for July, 60,926,000 lb and for August 1955, 87,206,000 lb. In the same monthly sequence, aluminum castings shipments were 61,528,000 lb, 52,955,000 lb and 64,864,000 lb. For zinc they were 52,321,000 lb, 42,227,000 lb and 62,677,000 lb.

1957 CONGRESS: Next year's International Foundry Congress will be held in Stockholm, Aug. 19-24. Foundry technical groups of Norway, Denmark and Finland will collaborate with the host Swedish association in planning the meeting. The Congress will not include a trade fair such as was conducted during the recent Dusseldorf convention.

MISCELLANY: Cleveland Punch & Shear Works Co., Cleveland, is discontinuing its City Foundry Division . . . Ampco Metal Inc., Milwaukee, is completing installation of a large annealing furnace and automatic shell molding machine. The recent boiler explosion which wrecked the Ampco offices did not damage production facilities . . . Centrifugal Casting Co., Long Beach, Calif., is building a 6400-sq-ft plant addition . . . Zirconium Corp. of America, Solon, O., has reduced prices of zirconia refractories up to 25 per cent . . . Hydro-Blast, Chicago, has become a division of Guardite Inc., Chicago, manufacturer of vacuum process, testing and special handling equipment . . . Northern Ordnance Inc., Minneapolis, has been awarded a $23-million Navy contract to produce guided missiles.

Prices of Foundry Metals and Coke

(As of Oct. 26, 1956)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$17.00-18.00
OVEN	
Birmingham	$27.60
Buffalo	29.50
Detroit	29.50
Erie, Pa.	29.50
Indianapolis	28.75
Kearny, N. J.	28.75
Milwaukee	29.50
Montreal, Que.	30.00
Neville Island (Pittsburgh)	28.25
New England, deld.	30.55
Painesville, O.	29.50
Philadelphia	28.50
St. Louis	28.50
St. Paul	28.50
Swedeland, Pa.	28.50
Terre Haute, Ind.	28.75

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$65.00	$65.50
Birmingham	59.00	63.00
Buffalo	63.00	63.50
Chicago	63.00	63.00
Cleveland	63.00	63.00
Duluth	63.00	63.00
Erie, Pa.	63.00	63.00
Everett, Mass.	63.75	64.25
Fontana, Calif.	70.50	....
Geneva, Utah	63.00	....
Granite City, Ill.	64.90	65.40
Lone Star, Tex.	59.00	....
Neville Island (Pittsburgh)	63.00	63.00
Steelton, Pa.	65.00	65.50
Swedeland, Pa.	65.00	65.50
Toledo, O.	63.00	63.00
Troy, N. Y.	65.00	65.50
Youngstown, O.	....	63.00

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

ALUMINUM: 99 per cent plus primary ingots 27.10. Secondary No. 12 alloy 24.00-24.50. Deoxidizing grades: No. 1 24.25; No. 4 22.25.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 36.00-40.00 delivered Connecticut valley.

ZINC: High grade 14.85 delivered. Die casting alloy No. 3, 18.00, No. 2, 19.00, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$42.00-43.00	**$53.00-54.00	.....	.....	.....	.....	$74.00-75.00
Boston*	**48.00-49.00	**44.50-45.50	.....	.....	**45.50-46.00	.....	.....
Buffalo	57.00-58.00	**49.00-50.00	.....	.....	**54.00-55.00	.....	77.00-78.00
Chicago	56.00-60.00	50.00-51.00	.....	55.00-56.00	55.00-56.00	70.00-71.00	81.00-83.00
Cincinnati*	**56.00-57.00	**48.00-49.00	**47.00-48.00	.....	**58.00-59.00	.....	**76.00-77.00
Cleveland	61.00-62.00	57.00-58.00	48.00-49.00	56.00-57.00	59.00-60.00	70.00-71.00	83.00-85.00
Detroit*	**55.00	**48.00	**41.00	**53.00	.....	**52.00	.....
Los Angeles	57.00	**60.00	.....	.....	.....	.....	.....
New York*	52.00-53.00	46.00-47.00	48.00-48.50	.....	.....	.....	.....
Philadelphia	57.00-58.00	53.00-54.00	56.00-57.00	.....	58.00-59.00	68.00	77.00-80.00
Pittsburgh	55.00-56.00	51.00-52.00	49.00-50.00	.....	58.00-59.00	.....	79.00-81.00
St. Louis*	51.50	50.00	43.00	53.00	.....	.....	80.00
San Francisco	55.00	60.00	42.00	60.00	60.00	.....	.....
Seattle	51.00	50.00-52.00	48.00-50.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point

WHITEHEAD'S
MOISTURE CONTROLLED
NATURAL BONDED
DORCHESTER MOLDING SANDS AND GRAVELS

Guaranteed Moisture Content Not More Than 6%

LEADER IN FOUNDRY SANDS SINCE 1841

These natural bonded sands and gravels are widely used for Molds and Cores in Iron, Steel, Alloy, and Non-Ferrous Castings. They are noted for colloidal clay giving high green and dry strength. Because of low fines in the grain distribution, these sands have high permeability. Here are advantages you may expect from Whitehead's Naturally Bonded Moisture Controlled Dorchester Sands and Gravels.

1 ***Moisture Controlled Sands Do Not Freeze—***

a. Easier to unload . . . means lower unloading costs.
b. Reduces handling costs to and from storage bins.

2 ***Moisture Controlled Sands Are Economical—***

a. Sands with 15% moisture have 1700 lbs. sand and 300 lbs. water in each ton.
b. Moisture Controlled Sands with 6% moisture have 1880 lbs. sand and 120 lbs. water in each ton.
c. On each ton of Moisture Controlled Sands you *SAVE price of sand and freight on 180 lbs. of water.* Sand has just proper amount of moisture to eliminate dust hazard.

3 ***Ready for Use on Arrival at Foundry—***

a. Dorchester Moisture Controlled Sands and Gravels arrive with proper working moisture content so that they can be used at once.
b. Aids you in control of sands in foundry.

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence 1, R. I.

Manufacturers of:

LYQUAGRIP
Ready-to-use core paste

DOB-IT
Ready-to-use core mudding compound

JOINT-SEAL
Plastic compound for perfect sealing

LYQUAFLOUR
For cleaner surface, better shakeout

LYQUAFACE
The liquid sand grain coating

Circle 582 on Inquiry Card—Page 255

NOW!

WHEELABRATOR®

SUPER TUM

7 CU. FT. 14 CU. FT. 28 CU. FT.

WHEELABRATOR®
SUPER TUMBLASTS

NOW the 28 cu. ft. Super Tumblast is supplemented by two smaller sizes incorporating the same cost-saving features . . . the 7 cu. ft. and the 14 cu. ft. models. With this range of sizes we can handle large work and small work in any kind of production situation. The phenomenal success of the 28 cu. ft. model, in effecting super-savings in maintenance and operating costs, has already produced orders for

BLAST comes in 3 sizes

TO MAKE SUPER SAVINGS IN MORE PLANTS

only **WHEELABRATOR®** *Super Tumblasts* **offer these features** for Operating and Maintenance Savings

super-capacity wheel

The new Super-Capacity Wheel throws more than twice as much abrasive as any similar sized wheel previously used. Combined with a blast pattern spread over the entire blast chamber, it provides faster, more uniform cleaning with less power per pound of abrasive thrown. A new, strain-free blade holder and easy-access wheel guard housing makes service easier, faster.

super-efficient separator

The Super-Efficient Separator effects new savings in abrasive use and wear on machine parts. With 300% greater efficiency, it removes all sand and scale that would cause excessive machine wear but does not remove abrasives until they are too small for use. Location of the separator directly below the cleaning chamber also simplifies maintenance of the unit.

super-tight cleaning chamber

This is the tightest steel flight conveyor ever used in blast equipment. There are no open spaces where small work can be caught and damaged. There are no areas where work can jam and displace liners, interfere with operation of the door, or break the abrasive-tight seal. This helps to reduce downtime to the minimum. (The 7 cu. ft. machine can be equipped with either rubber or steel apron conveyor.)

super-sealed door

The new Super-Sealed Door keeps all abrasive in the machine and provides trouble-free operation on any type of work. The power-operated, reinforced, one-piece door will withstand impacts from either side without jamming or warping. Traveling in tracks that are integral with the side frames of the machine, it forms an abrasive seal as strong as the machine itself.

LONG-LYFE parts throughout

Every high-wear point within the Super Tumblast is equipped with genuine Wheelabrator Long-Lyfe Parts. These parts are made of a patented alloy steel fully heat-treated for maximum possible wearable life. They last many times longer than ordinary parts to save hours in replacement time, machine downtime, ordering and handling time, and to reduce shipping and storage costs.

the NEW sizes — and the list is snowballing. A partial list of Super Tumblast customers includes: *Unitcast Corp., Dayton Malleable Iron Co., Indiana Forge & Machine Co., Malleable Iron Fittings Co., Hallstead Iron Foundry Co., American Forge Div., Standard Forgings Corp., Walworth Co., The Wilmington Casting Co., Hughes Tool Co., American Forge Div., Canada Iron Foundries, Ltd., Northern Indiana Brass Co., Landers, Frary & Clark, Bethlehem Steel Corp., American Hoist & Derrick Co., Harrisburg Steel Corp., Central Foundry Div. Saginaw, Mich., and others.*

Write for complete literature today

WHEELABRATOR
CORPORATION

505 S. Byrkit Street — Mishawaka, Indiana

World's Largest Builders of Airless Blast Equipment and Steel Abrasives

Circle 583 on Inquiry Card—Page 255

HYSTER INDUSTRIAL TRUCKS MOVE MATERIALS *FASTER!*

at Greater PROFIT to You

LP-Gas equipped YC-40 at Atlas Foundry. Used for smaller work-horse materials handling such as barrels of small castings and pig iron, palletized finished castings and assembled units.

Pictured above is one of many typical examples of how Hyster® Industrial Trucks are helping to effect tremendous savings in the cost of materials handling in Foundries.

Even if you are now using lift trucks or have never used industrial trucks of any kind, your Hyster dealer can show you how you can quickly realize more profit from your operation with these multi-purpose utility tools. Your Hyster dealer knows materials handling . . . he is an expert on the problems and their solution. He can help you with special techniques and cost reducing methods. Call him today...why not take advantage of his materials handling know-how?

HYSTER DEALERS GIVE YOU ALL 3!

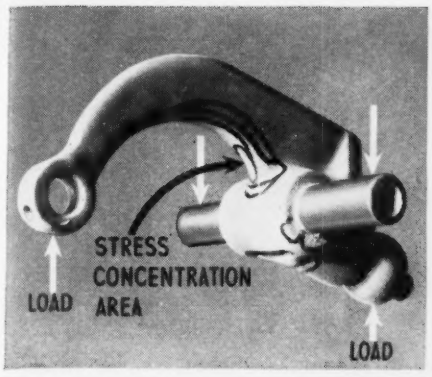
1. **PLANNING** — your Hyster Dealer will plan your materials handling operation from scratch, or will analyze your present system to see if it can be improved.
2. **THE RIGHT TRUCK**—for your job from Hyster's complete line of industrial trucks (1,000-30,000 lbs.) and over 100 job-attachments.
3. **THE RIGHT SERVICE**—ample spare parts stock, shop facilities, factory-trained mechanics and an efficient field service that keep your Hyster lift trucks going on your job, wherever your job might be located. Hyster trucks are noted the world over for their low downtime.

Materials Handling Trucks from 1,000 to 30,000 pound capacities

2902-30 N. E. CLACKAMAS, PORTLAND 8, OREGON
1010-30 MYERS STREET.....DANVILLE, ILLINOIS
HYSTER N.V. .....NIJMEGEN, THE NETHERLANDS
FOUR FACTORIES: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands.

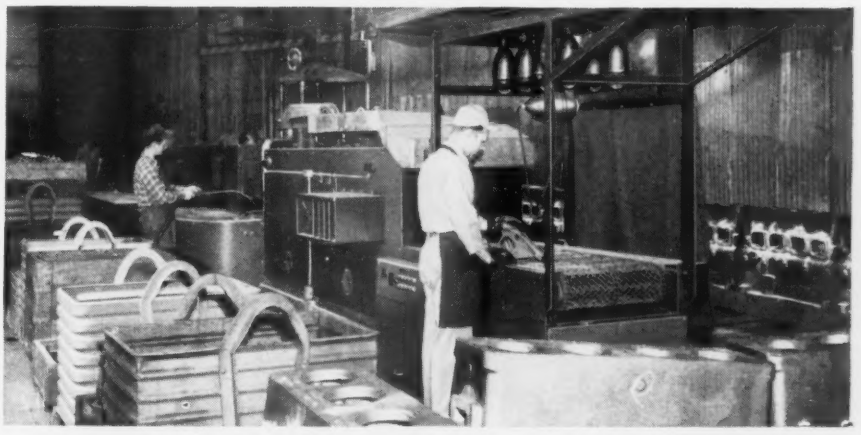
HYSTER

HYSTER COMPANY



STRESSCOAT IMPROVES CASTING DESIGN—This Magnaflux developed brittle lacquer coating is used for testing and measuring stress in working parts or designs. Stress analysis is providing new ways to reduce cost and weight of products to make them lighter, stronger and cheaper.

Case Studies:
NONDESTRUCTIVE TESTING SYSTEMS



Custom testing installation for malleable castings.

New Methods Increase Profits and Expand the Market for Castings—Help Improve Foundry Practices

MAGNATEST SORTS CONTAMINATED CASTINGS by using their conductivity to measure purity. A small hand held coil induces eddy currents in parts which in turn registers on the dial. By observing changes in this current you can determine the degree of contamination. 10,000 red brass castings were recently sorted by this means at a rate of 500 per hour.

In today's economy, the profit-minded foundryman strives for consistent quality rather than perfection. This consistency pays off for both the foundryman and user.

Magnaflux offers a variety of nondestructive testing methods to aid you in achieving consistent quality in day-to-day foundry production. For instance, consistent quality starts with good casting design. M Stresscoat is invaluable for measuring stress and load concentrations, to develop designs for light, stronger and cheaper cast parts.

Magnaglo tests on pilot runs can indicate troublesome pouring or handling practices which may contribute to cracks and other defects in finished parts. With Magnaflux, Magnaglo or Zyglo methods all severe cracks in any metal can be found and evaluated. Thus, you eliminate scrapping of good castings for seemingly visible defects that have no bearing upon the true strength or service life of the casting. If serious defects do exist, proper corrective action can be taken before further costly processing. For any selected service level, M test systems permit you to set the standards and hold to them. After correct procedures have once been established, only a sampling "finger-on-the-pulse" inspection is required to insure consistent, reliable casting production. These are profitable steps to building acceptance and expanding marketing opportunities for cast parts.

For detailed information on M applications for your specific operation, call in one of our experienced Magnaflux engineers, or write today.

FOOLPROOF METHODS FOR LARGE OR SMALL CASTINGS

M offers a variety of fast, low cost, nondestructive methods for testing ferrous and non-ferrous castings of every size and shape from watch cases to valves or side frames. Whether you require a custom installation for steady production-line operation, or a portable unit for sampling tests in your production process, we can supply systems to meet your exact needs.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

MAGNAFLUX CORPORATION

Write for complete details concerning any of the above case studies, (excerpts from MAGNAFACTS), or ask for our new booklet on Lower Manufacturing Costs.

Take Your Inspection Problems to the House of Answers . . .

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Circle 585 on Inquiry Card—Page 255

8 REASONS WHY

leading SHELL MOLDERS prefer

DOW CORNING 8 EMULSION

SILICONE RELEASE AGENT

faster, easier release
minimum build-up—closer tolerance shells
stepped-up production—maximum number of shells between pattern cleanings
easy to apply—faster wetting action
economical in extremely low concentrations
resists creaming or separation
non-flammable
fast delivery from centrally located warehouses

Other Dow Corning silicone products for shell molding include: Dow Corning 7 Compound, a non-melting, translucent, greaselike release agent that is unexcelled for breaking in new patterns and Dow Corning F-452, a solvent type release agent.

first in silicones

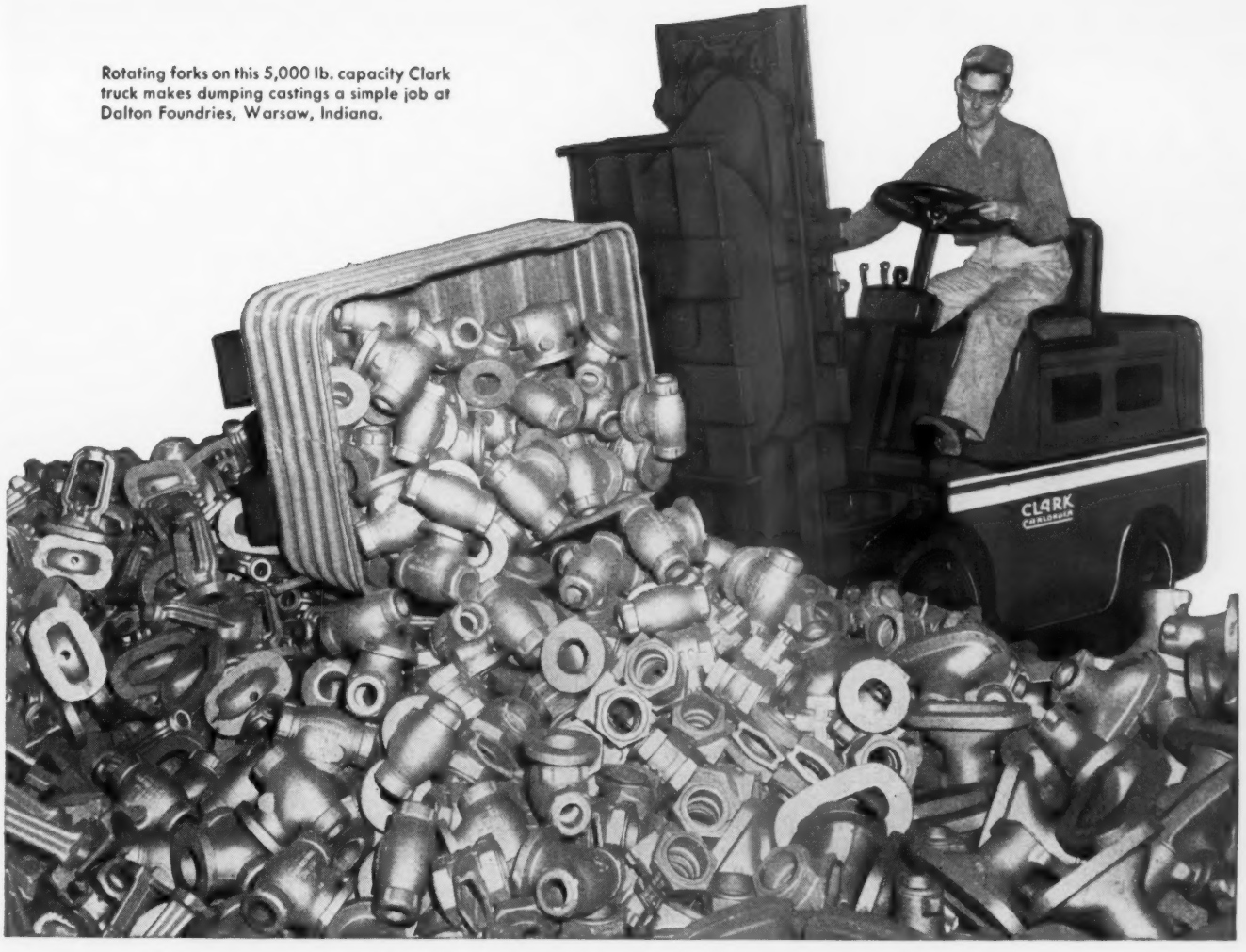
Generous *Free Sample* and latest data on request

DOW CORNING SILICONES

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

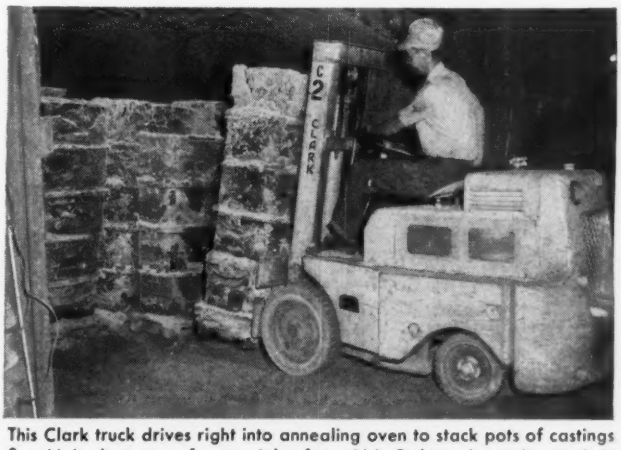
ATLANTA BOSTON CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (SILVER SPRING, MD.)
CANADA: DOW CORNING SILICONES LTD., TORONTO GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON FRANCE: ST. GOBAIN, PARIS

Rotating forks on this 5,000 lb. capacity Clark truck makes dumping castings a simple job at Dalton Foundries, Warsaw, Indiana.



WHAT DOES THIS JOB COST YOU?

In Dalton's grey iron foundry, Clark trucks handle 200 tons of castings a day. At the malleable furnace *one* man now dumps 55 tons of scrap into the furnace in just 4 hours. In the annealing department Clark trucks go directly into the ovens to stack pots five high. From shakeout to shipping, Dalton's Clark trucks are lifting, moving, dumping; performing a multitude of jobs throughout the foundry at lowest possible cost. Take a close look at your own operation —what are these jobs costing *you?*



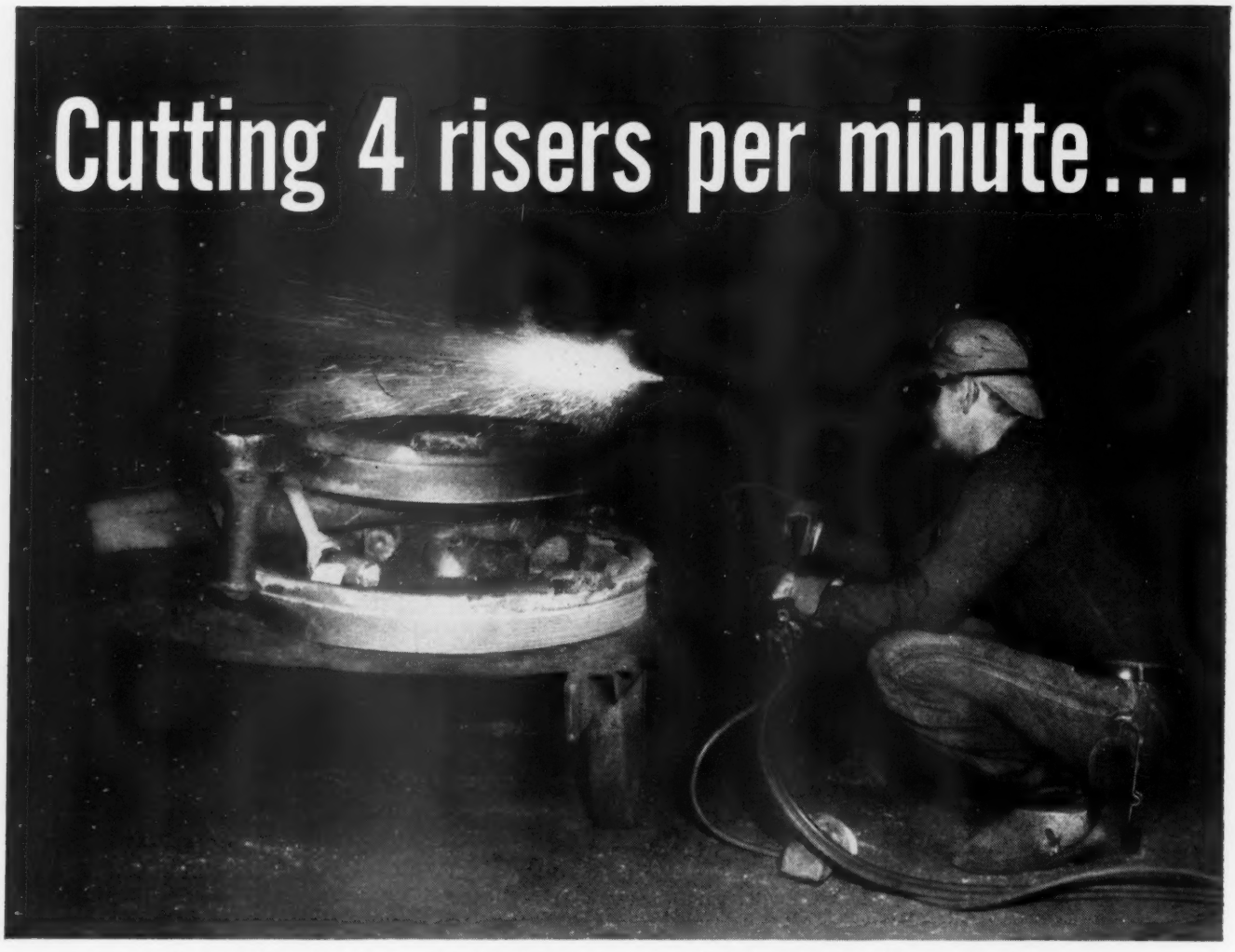
This Clark truck drives right into annealing oven to stack pots of castings five high. Just one of *many* jobs for which Dalton depends on their Clark trucks.

The quickly changed shovels, rotating devices, or dumping hoppers are just a few of a complete line of attachments that can make a Clark truck the most versatile tool in your foundry. Gas, LP gas, diesel or electric—from ½ ton to over 12 tons capacity—each truck able to make a specific operation just part of a dozen jobs. One Clark truck can make the competitive difference in *any* foundry, while the money saved usually more than pays for the equipment. LOOK IN THE YELLOW PAGES UNDER "TRUCKS, INDUSTRIAL" FOR THE CLARK DEALER NEAREST YOU.

CLARK® EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 16, Michigan

Cutting 4 risers per minute...



Lightweight and easy to handle, this OXWELD powder-cutting blowpipe makes fast work of risers.

Powder-Cutting speeds removal operations 300%

Removing risers from stainless steel castings need no longer be costly and time consuming. Pictured above is a typical powder-cutting operation at the Ohio Steel Foundry Company, Springfield, Ohio. Here, 2 by 4 inch thick stainless steel risers are removed by powder-cutting in only 15 seconds. By methods previously used, this operation took up to four times longer.

In the powder-cutting process metal powder is automatically injected into an oxygen flame to increase the flame's heat and severing action speed. The powder process is helping users gain new efficiency and speed in the removal of gates and risers, sand incrustations, and casting defects.

The powder-cutting blowpipe used in this operation, an OXWELD AC-4, is designed for hand cutting of oxidation resistant metals such as stainless steel, chrome alloys, and cast iron. Heavier apparatus is also available for manual and mechanized operations.

Increase your production and profit—call your local LINDE representative, or write for illustrated literature on LINDE's modern processes. Start saving now, do it today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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Division of Union Carbide Canada Limited, Toronto

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"Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

to help us
serve you
better...

3600 SQUARE FEET OF **ADDITIONAL** LABORATORY FLOOR SPACE FOR
EXACTING PRODUCT CONTROL AND NEW PRODUCT DEVELOPMENT

Thiem PRODUCTS, INC. • Milwaukee 14, Wis.
MANUFACTURERS OF FOUNDRY PRODUCTS EXCLUSIVELY

Circle 589 on Inquiry Card—Page 255

An Important Message to Foundry Executives

Competition and the Seven

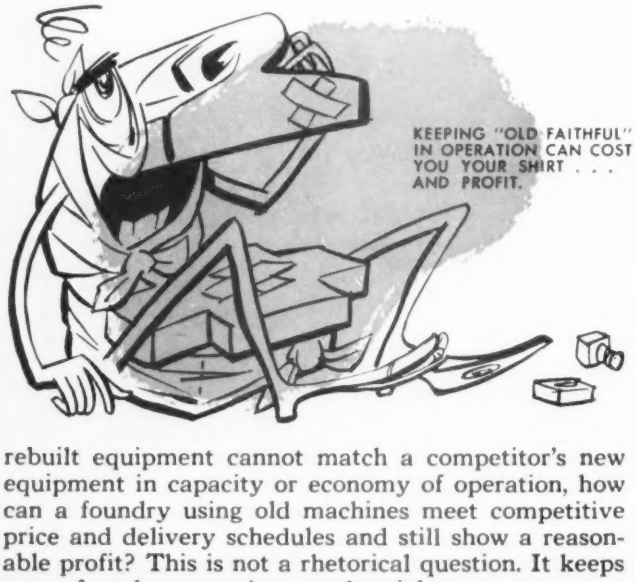
The *Law of Diminishing Returns* is becoming a curse in foundries of all types. Chief cause is the greatly accelerated rate of obsolescence in molding machines . . . and *time* is the key factor.

Seven years is a *relative* increment of time. Its significance varies with the subject concerned. A child of seven is only a youngster, still fourteen years short of maturity. A dog is pushing the averages at seven. And a foundry molding machine that is seven years old or older . . . no matter how well it has been maintained . . . is *economically* obsolete.

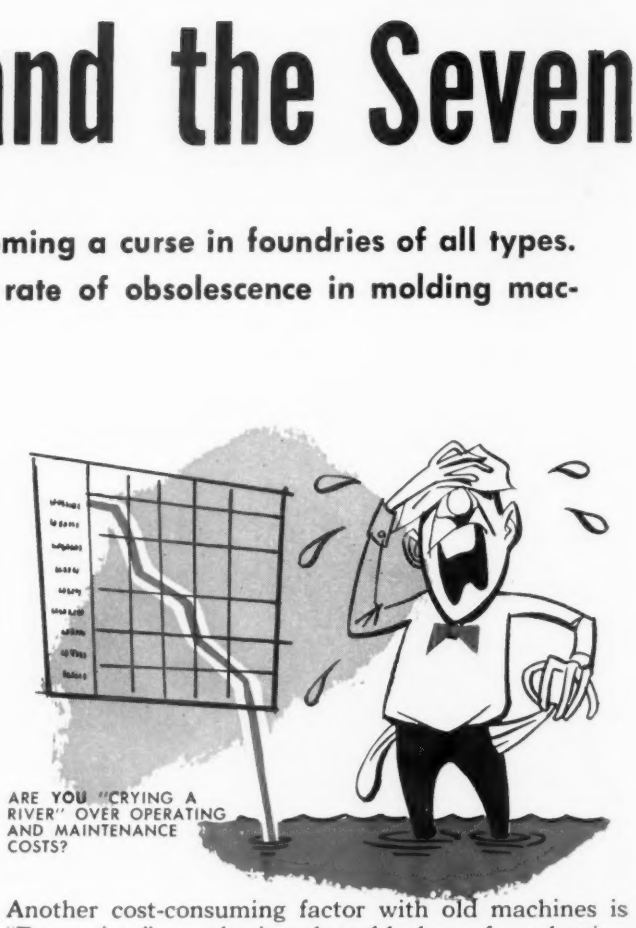
Other types of machinery still are in their prime at age seven. Why is the molding machine an exception? The answer is simple. Its environment as well as its function are unfavorable to longevity.

The abrasive action of sand is an accepted evil in molding operations. Every foundry has experienced profit-cutting "replacement costs", even with the best equipment. What many foundry executives overlook, however, is the fact that *replacement parts do not make a new machine.* They can bring a machine back to its *own* standard, but they cannot compensate for new production techniques or for basic improvements in molding machine design.

Admittedly, it is cheaper . . . in the short run . . . to replace parts than to purchase new machines. But what are the long-range aspects of this practice? If



rebuilt equipment cannot match a competitor's new equipment in capacity or economy of operation, how can a foundry using old machines meet competitive price and delivery schedules and still show a reasonable profit? This is not a rhetorical question. It keeps many foundry executives awake nights.



Another cost-consuming factor with old machines is "Down-time" . . . the irreplaceable loss of production capacity. The older a machine is, the more maintenance it requires, the greater the periodic down-time. *Unfortunately, "overhead costs" never stop for replacement.*

Consider your foundry's situation for a moment. Can you meet or beat your major competitors' price, quality and delivery? If you can, you are most fortunate. But . . . let's suppose you *are* at a competitive disadvantage. How long can you stay in that position and survive?

In industry, as in war, there are "the quick" and "the dead". The former keep pace with industry trends and changes . . . know when and how to improve operations and maintain their favorable position. These aggressive men also follow the policy of continual investment in new equipment.

The "dead" try to stand still in a moving current. They practice short-range economies and philosophies. And eventually they drown in the steadily rising river of competition.

The foundry economy is in a dramatic state of flux. A major factor is the growth of *automation* . . . a science with exciting, almost magical, overtones but with an extremely practical foundation. Automation is the large company's answer to shrinking profits as well as to greater production capacity of uniform standard. It is not, however, economically feasible for the majority

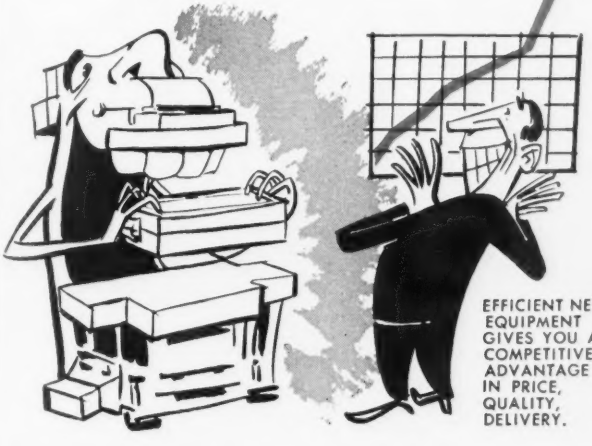
Concerning . . .

Year Curse

of jobbing or production foundries. In most cases, automated operations involve a far-greater-than-average capital expenditure.

This message is directed therefore to foundrymen who want to achieve greater efficiency and profits at relatively low cost. The answer here also is simple. *Invest in new high-speed semi-automatic equipment.* Relegate your seven year old molding machines to odd jobs. Or put them on the used machinery market. (There still are many who cannot see the "wolf at the door".)

Once you have made this decision, select your new molding equipment carefully. But remember that old buying habits, like old machines, can cost you more in the long run.

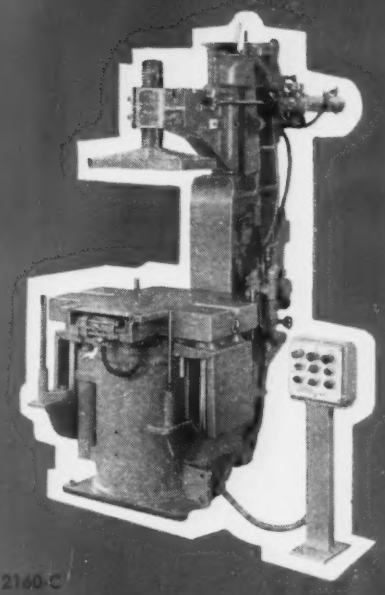


EFFICIENT NEW EQUIPMENT GIVES YOU A COMPETITIVE ADVANTAGE IN PRICE, QUALITY, DELIVERY.

Your best bet is to select equipment made by the manufacturer who leads the industry in Creative Engineering . . . SPO Incorporated. Technological innovations developed by this company since World War II have had a profound effect on the foundry industry.

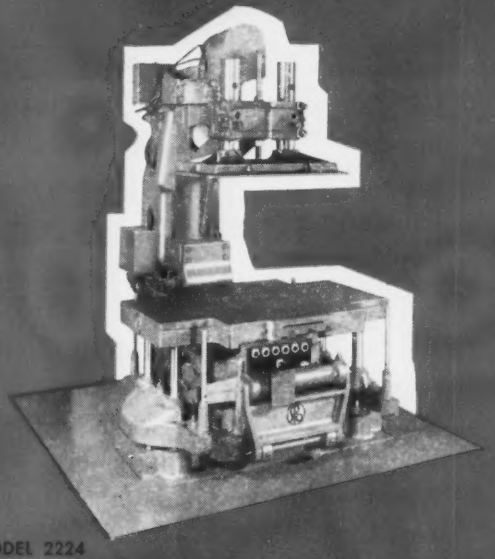
SPO "firsts" include development of the maintenance-free inverted jolt mechanism . . . the fully automatic SPOMATIC molding system and its components . . . the first practical hollow core machine . . . the self-aligning stripping mechanism . . . and the first successful application of green sand cores.

These accomplishments have established SPO as the leader in molding machine and ancillary equipment development. That is why SPO has become the world's largest supplier of molding machines, offering a complete range of types and sizes. SPO INCORPORATED, 6449 Grand Division Avenue, Cleveland 25, Ohio



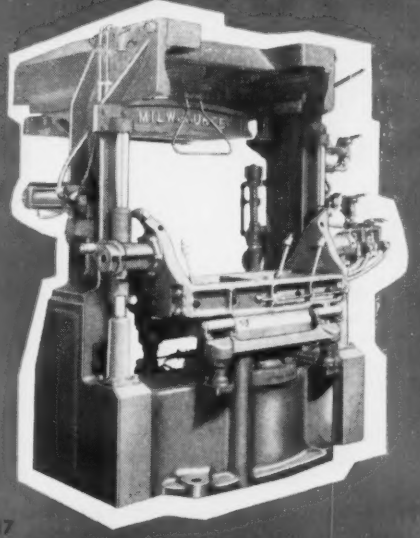
MODEL 2160-C

Series 2000-C *jolt-squeeze-strip/draw* machines feature automatic controls and simplified pushbutton operation. Available with squeeze cylinder diameters of 13, 14 and 16 inches.



MODEL 2224

Featuring patented "inverted jolt" mechanism, this semi-automatic Series 2000 *jolt-squeeze-strip* machine handles wide range of flask sizes. Seven models available with jolt capacities from 1500 to 4000 pounds.



MODEL 217

This SPO-MILWAUKEE *jolt-squeeze-rollover-draw* machine combines all operations in simplest possible cycle for fast production of drag molds. Three models available (16, 21 and 30-inch squeeze pistons).

LITHIUM

...the Miracle Metal

Over 100 Brass & Bronze Foundries Can't Be Wrong!

Last year over 30,000,000 pounds of copper were degasified with Lithium Metal . . . and the volume is constantly increasing. A little Lithium goes a long way. It's a fact that only 0.005% metallic Lithium makes a sounder, more uniform, nonferrous casting . . . in less time with less trouble and at lower cost.

Large size Lithium Cartridges (108 grams) are used for the degasification of large melts of copper including high conductivity metal. Small Lithium Cartridges (2¼, 4½ and 9 grams) are for foundry use in the refinement of high temperature copper, brass, bronze, and nickel-silver castings. Even the salts of Lithium (Carbonate and Chloride, especially) hold great promise for heat treating by reason of their properties in lowering bath melting points.

Is *your* foundry using Lithium? Truly the "ally of alloys," Lithium could hold the same hope for *you*. Look into Lithium. Write for details on actual foundry tests.

... trends ahead in industrial applications for lithium

LITHIUM CORPORATION OF AMERICA, INC.
2600 RAND TOWER
MINNEAPOLIS 2, MINN.

MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • BRANCH SALES OFFICES: New York Pittsburgh • Chicago • CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

Prompt service from local Michigan Distributor, Deeds Equipment Co., is one of many reasons Marion Foundry is so pleased with their new Model 12B Tractor Shovels. Marion has made gray iron castings for over 50 years.

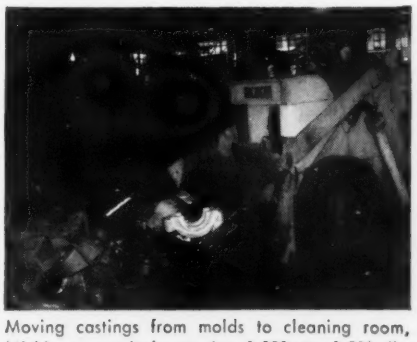
Axle breakage,
low production problems solved . . .

Indiana foundry boosts sand output to 200 tons hourly with 2 Michigans

Like many foundries, Marion Machinery Foundry & Supply Company of Marion, Indiana, had always taken the frequent troubles on their loaders pretty much for granted. No matter what make they used, rough service, typical of foundries everywhere, caused continual high maintenance. Low output was a problem, too, because machines rarely could heap and carry a full bucket.

Performance earns repeat order

Then, early in 1956, the new Michigan 15 cubic foot Model 12B Tractor Shovel became available. Marion officials took a long look at it. They studied its trouble-free all-Clark power train (including power-shift transmission, torque converter, and planetary axle). They bought one. Two months later, they bought another.



Moving castings from molds to cleaning room, Michigan regularly carries 1,000 to 1,500 lbs per load. Rig also transports such bagged materials as clay, pitch, and bentonite around the 50,000 sq ft foundry.

25% more power and weight

Today, each Michigan moves an average of over 100 tons of sand per hour — a figure, Company Vice President Gilbert Mauk says, their two former 14 cu ft tractor shovels "couldn't begin to aproach." The 15 cu ft Michigans unload sand from railroad cars . . . transport sand from bins to muller and from muller to molders . . . windrow used sand at the molders, and carry it to stations. Their extra weight and power — 25% more than Marion Foundry's former loaders — help heap buckets to *over 100% of rated capacity!*

Eliminate broken axle problem

While output has gone up, downtime has decreased to practically nothing. Broken axles and drive-wheel suspensions have become a problem of the past. Hydraulic troubles have been stopped. A simple maintenance program—with daily cleaning of breathers, oiling and greasing — has even eliminated most of the short delays.

Available on low-cost lease plan

This excellent efficiency, coupled with Marion Foundry's fine maintenance program, *proves* the new Michigan Model 12B Tractor Shovels have what it takes to deliver trouble-free service. For proof, see a Model 12B in action *in your own plant!* Let your own operators run it on any task you say. Measure output . . . compare performance . . . then pick the size bucket you need. Five sizes now available: 6, 10, 15 (standard), 20, and 27 cubic feet. Choose the finance plan best suited to your investment program, too—including the popular Michigan Lease-Purchase Plan which lets you put one or more Michigans in your plant without laying out a penny of capital.

Michigan is a registered trade-mark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2475 Pipestone Road
Benton Harbor 42, Michigan

CLARK® EQUIPMENT

Circle 592 on Inquiry Card—Page 255

EASY ON THE DRAW

...every core comes clean!

The Air-Powered CP Core Box Vibrator really increases core output! Sledging is eliminated . . . core box maintenance is reduced . . . and there's no troweling. Simply clamp the vibrator to the inverted box, its 9000 orbital vibrations per minute assure a clean, perfect draw . . . no flaws, damaged edges, distorted sections or dimensional variations. The fast acting air clamp of the CP-219 grabs any cleat up to 6 inches – frees cores weighing up to 3000 pounds in less than 90 seconds! No special adaptors or fixtures are required. Write for details. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic
PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

1150 tons in a 21-day period!

"We really whoop it to our Lectromelt* Furnace," reports Omaha Steel Works who have a CQT Lectromelt nominally rated at 2.2 tons per hour output

12 to 13 heats per day, in 18 to 19 hours of furnace operation; that's the stiff schedule on which Omaha Steel Works of Omaha, Nebraska works. They've produced as high as 1150 tons in a 21-day period—metal meeting the highest standards for quality and uniformity.

That's the advantage of working with a Lectromelt furnace. Analyses can be adjusted with extreme accuracy. Temperatures are held just right for casting.

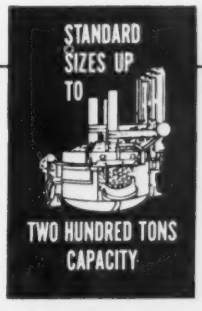
Lectromelt's system of top charging gives smooth, fast turnaround in electric furnace operation. Power can be poured into a Lectromelt furnace, assuring maximum daily production. Micro-accurate electrode operation combines with counterbalanced arms to make control more exact.

Catalog 9-B describes these furnaces. For a copy, write Lectromelt Furnace Company, 314 32nd Street, Pittsburgh 30, Pa. (a McGraw Electric Company Division).

Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa . . . JAPAN: Daido Steel Co., Ltd., Nagova

*REG. T. M. U. S. PAT. OFF

WHEN YOU MELT... *Lectromelt*



Circle 594 on Inquiry Card—Page 255

NOW—PRECISION-MADE S

Unique Optical Comparator Assures Accurate C

As the first to apply the technique of micrometric projection to the manufacture of wire screen cloth, Hewitt-Robins can now meet the most exacting specifications every time. With the use of this Optical Comparator, an unusually high degree of accuracy can be obtained because all measurements and comparisons are made on a greatly enlarged image rather than on the object itself. There is no direct contact with any part nor can there be any deformity caused from measuring pressure.

The actual wire sample is projected on a master chart with such magnification that the operator can instantly see and correct the smallest variation in the specified crimp. As a result, the crimping machine can be adjusted to three decimal places to obtain maximum uniformity of product.

This is one more special Hewitt-Robins technique for assuring you the finest in wire screen cloth for every sizing, separating or screening operation. Hewitt-Robins wire screen cloth is tougher . . . resists extreme abrasion . . . lasts longer. Every piece is tightly woven with precisely accurate openings and will provide you with higher operating efficiency and lowest cost per ton.

Hewitt-Robins screen cloth is obtainable in a wide variety of weaves in plain steel, spring steel, oil-tempered steel, stainless steel and many other alloys . . . is carried in stock in both Super and Gyraloy grades, 3/16" openings and coarser. HEWITT-ROBINS, STAMFORD, CONNECTICUT.

INDUSTRIAL DIVISIONS PRODUCTS

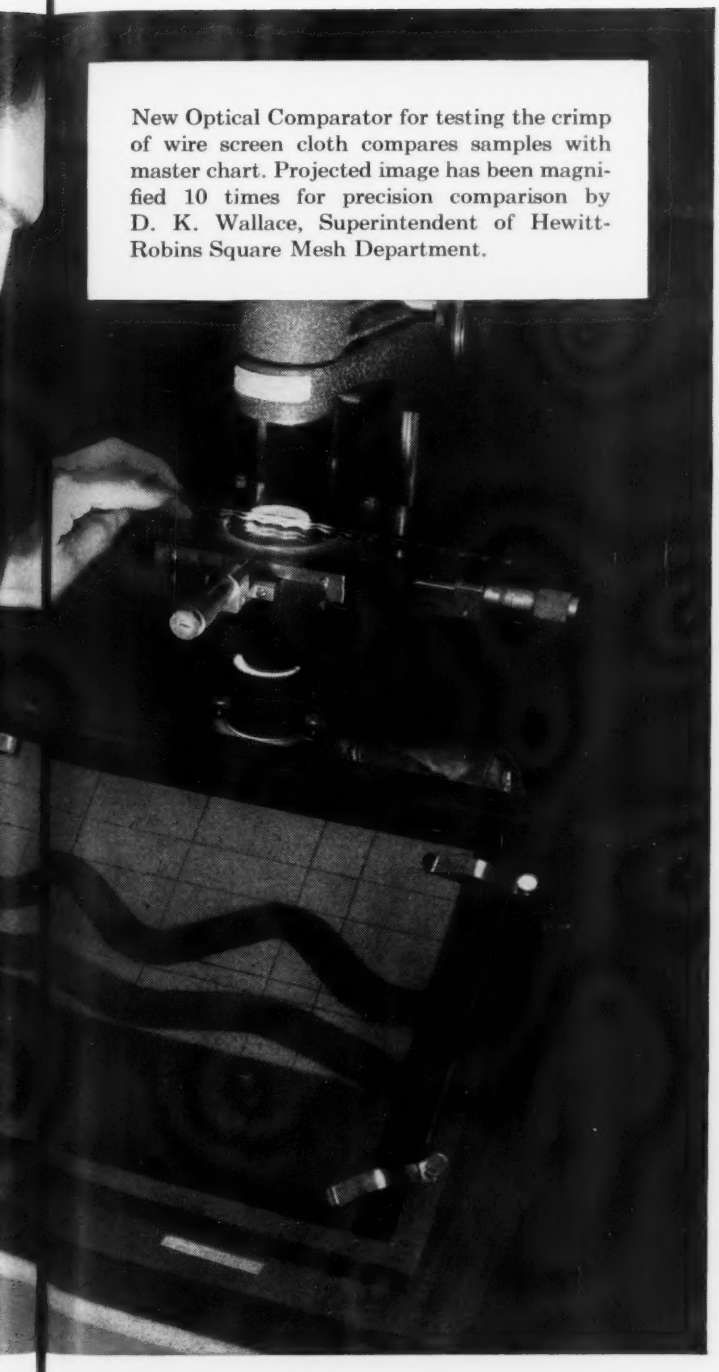
INDUSTRIAL HOSE • VIBRATING CONVEYORS
CONVEYOR BELTING • CONVEYOR MACHINERY
VIBRATING SCREENS • DESIGN, MANUFACTURE, ENGINEERING AND ERECTION OF COMPLETE BULK MATERIALS HANDLING SYSTEMS
"JONES" POWER TRANSMISSION EQUIPMENT
"GLIDE RIDE" THE NEW MOVING SIDEWALK

HR **HEWITT-** R

E SCREEN CLOTH

te *Quality Control*

New Optical Comparator for testing the crimp of wire screen cloth compares samples with master chart. Projected image has been magnified 10 times for precision comparison by D. K. Wallace, Superintendent of Hewitt-Robins Square Mesh Department.



-ROBINS

HEWITT-ROBINS VIBRATING SCREENS

Hewitt-Robins Vibrating Screens are manufactured in a variety of styles and a wide range of sizes for every need of industry.

GYREX SCREENS

General-purpose, positive-stroke, 4-bearing screen with amazing versatility of application and an unsurpassed record for stamina in service.

STYLES M AND MS VIBREX SCREENS

Full-floating, unbalanced, pulley-type, 2-bearing screen. Offers sharp sizing of a wide variety of materials at low cost.

STYLE J VIBREX SCREENS

General-purpose screen applicable to a wide variety of screening operations. Wide range of sizes for suspended mounting.

STYLE HS HIGH-SPEED VIBREX

For fine screening operations (up to 100-mesh in some cases). Highly effective circle-throw screening action.

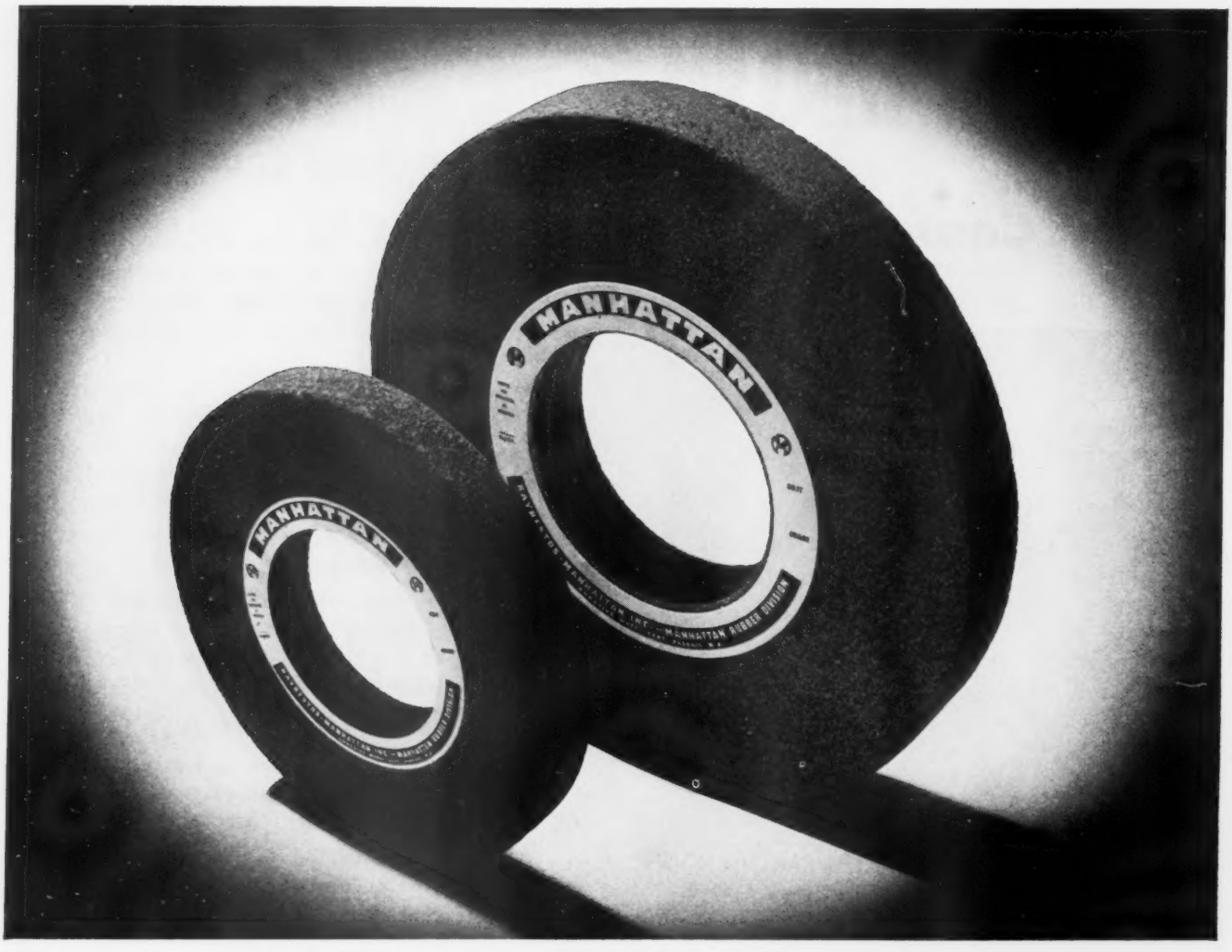
ELIPTEX SCREENS

Exclusive 3-way elliptical motion for sharpest sizing and most effective dewatering. Horizontal-operating flat screens.

HI-G SCREENS

Revolutionary new "modified resonance" principle permits larger screens and bigger capacities at less power. Unusually sharp screening action. Can be made in sizes larger than any other vibrating screen on the market.

FOR SERVICE AND INFORMATION ON BELTING AND HOSE CALL YOUR LOCAL HEWITT-ROBINS INDUSTRIAL SUPPLY DISTRIBUTOR LISTED IN THE "YELLOW PAGES"



MANHATTAN SNAGGING WHEELS
Remove More Metal at Less Cost

For maximum efficiency with stand or swing frame grinders, snagging wheels must be engineered for *your specific* grinding conditions. Manhattan snagging wheels are custom made to meet these conditions. A careful analysis of your particular needs by Manhattan abrasive wheel engineers determines the type of abrasive, grain size, hardness, structure and bond of the wheel you require. Tests have proved that Manhattan Snagging Wheels formulated by this method give maximum cutting action, permit free cutting at highest speeds . . . and *last longer!*

To protect you on reorders, laboratory and manufacturing quality controls at Manhattan assure duplication of the original engineered performance. You maintain this faster cutting and greater economy . . . *more* metal removed at *lower* cost with every Manhattan Wheel you buy.

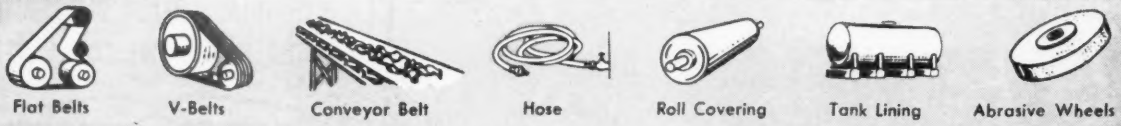
Let a Manhattan representative show you how you can get longer, trouble-free service . . . "More Use per Dollar" . . . with custom-engineered Manhattan Snagging Wheels, and other types of high speed, heavy duty wheels.

RM636

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO ABRASIVE WHEEL DEPARTMENT
MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



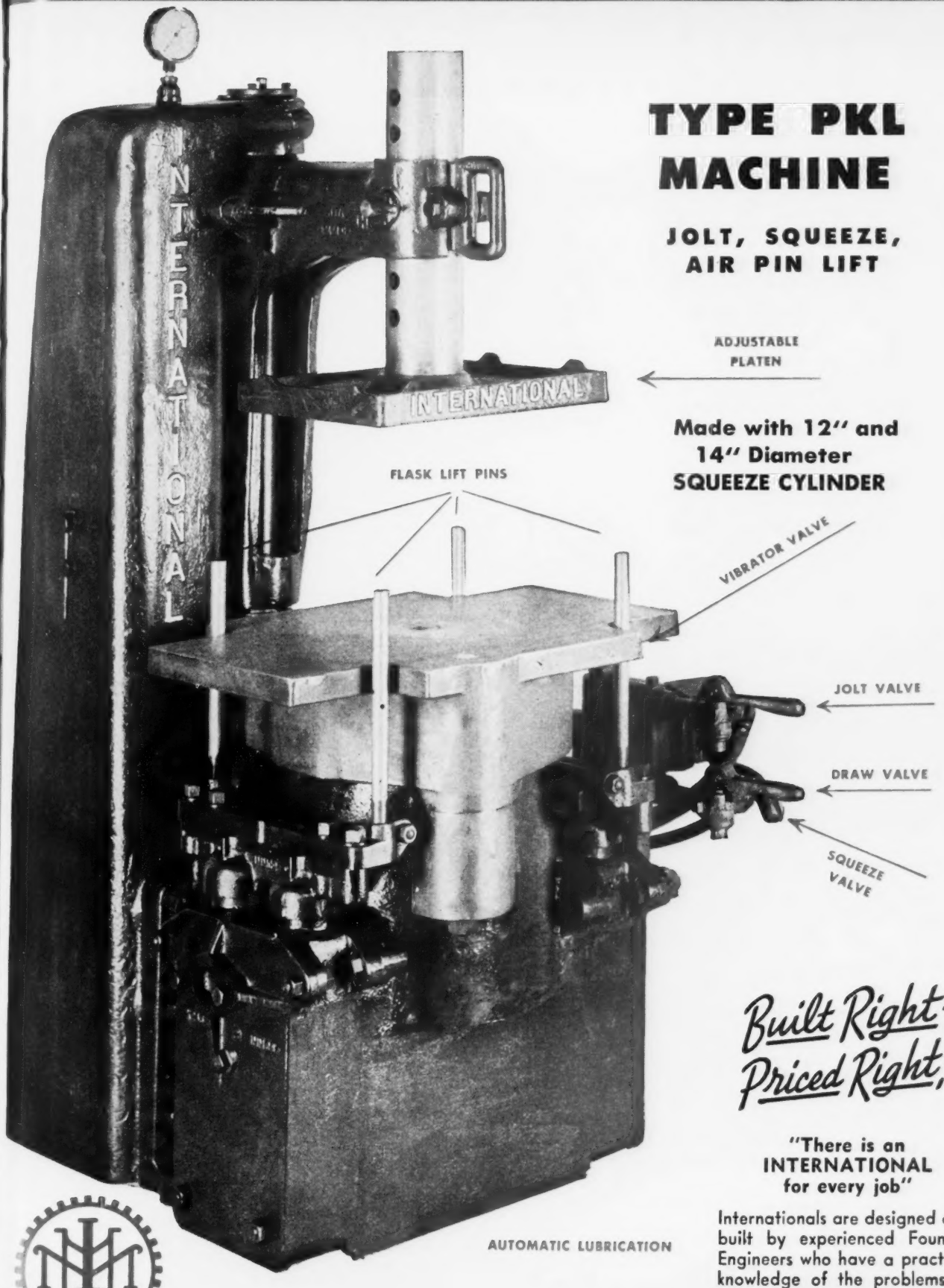
Flat Belts · V-Belts · Conveyor Belt · Hose · Roll Covering · Tank Lining · Abrasive Wheels

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

Circle 596 on Inquiry Card—Page 255

Circle 597 on Inquiry Card→

INTERNATIONAL



TYPE PKL MACHINE

JOLT, SQUEEZE, AIR PIN LIFT

Made with 12" and 14" Diameter SQUEEZE CYLINDER

Built Right- Priced Right!

"There is an INTERNATIONAL for every job"

Internationals are designed and built by experienced Foundry Engineers who have a practical knowledge of the problems of the foundry business.

INTERNATIONAL MOLDING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

You Benefit from ELECTROMET'S

through **Research * Development**

Production * Service

For 50 years ELECTROMET has produced ferro-alloys and metals essential in the production of steel, iron, and non-ferrous metals. Research and development by ELECTROMET during these 50 years have provided the trade with new and better alloys and metals to meet specific needs. Increased emphasis on research and development promises continued benefits in the future.

The ELECTROMET story is one of steady growth and progress for the benefit of the metal industries. When you buy from ELECTROMET, you get the best in alloys and service plus the advantages of long manufacturing experience and extensive research.

Here are some of the advantages you get from ELECTROMET's *integrated programs.*

Competent Metallurgists and Sales Engineers

Nine sales and service offices are strategically located in the major steel producing centers as shown on the map above. If you have a problem on metals or alloys, let one of our experienced metallurgists or sales engineers help you. He will be glad to assist you with any problems on the production of quality steels, irons, and non-ferrous metals. Simply telephone or write the ELECTROMET office nearest you.

B Ca Cb Cr Mn Si Ti V W Zr

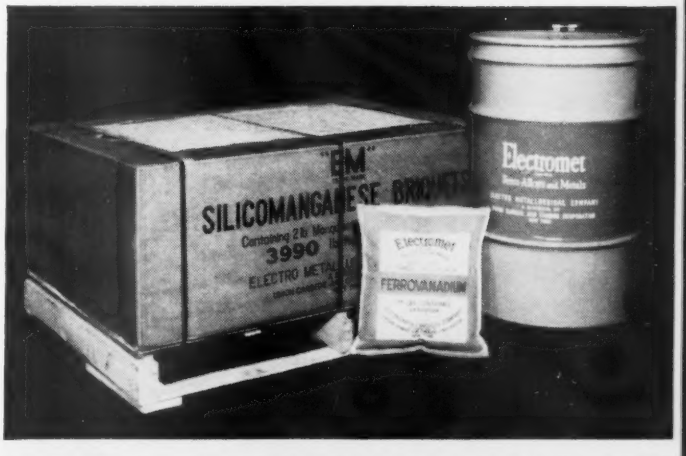
50 Years of Experience

Continuing Research and Development

Since 1906 ELECTROMET has carried on a three-way program of research, development, and technical service. More than 300 skilled research scientists, engineers, and technicians work in ELECTROMET's Metals Research Laboratories and Development Laboratories at Niagara Falls (shown here). This program provides you with new ferro-alloys and metals, better ways of using them, and new and improved alloy steels and irons. Innovations are fully developed in our laboratories before they are offered commercially.

Wide Range of Alloys to Meet Your Needs

Over 50 different products are manufactured to meet the regular requirements of the metal industry as well as the special needs of customers. This wide range of high-quality ferro-alloys and metals is the result of 50 years of research, development, and service by ELECTROMET. ELECTROMET offers the widest selection of ferro-alloys and metals to meet your specific requirements.

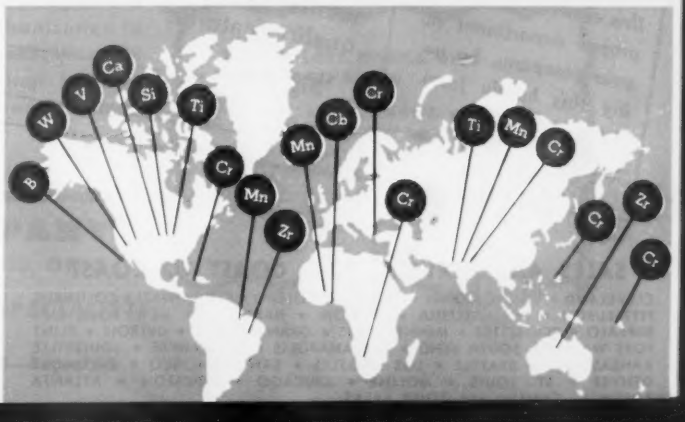


Seven Modern Plants—4 With Own Power Facilities

Our plants have been greatly expanded and modernized to meet the current demands for ferro-alloys and metals. The recently completed plant at Marietta, Ohio, is the world's largest ferro-alloy plant. Company-owned power facilities at four of the plants assure a constant supply of power for efficient production. Prompt shipment of ELECTROMET ferro-alloys is assured from all seven plants, and from six warehouses conveniently located to serve you.

World Wide Ore Sources

The availability of ores, and other raw materials is assured by ELECTROMET's diverse facilities, including mines and ore milling plants owned by UNION CARBIDE. Helping to assure adequate ore supplies are the ore buying facilities of Union Carbide Ore Company, a Division of Union Carbide and Carbon Corporation. Ores come from the far corners of the earth to ELECTROMET's plants. On this simplified map of the world, symbols for the chemical elements indicate a few of the major sources of alloy ores.



ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit • Houston • Los Angeles
New York • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

Guarantee TOP Performance and Maximum Life!

Specify THESE TOP QUALITY FEATURES..

(Standard on Miller Cylinders at no extra cost)

Specify CASE HARDENED CHROME PLATED PISTON RODS

On all Air and Hydraulic Cylinders

Benefits To You

CASE-HARDENED Piston Rods (52-54 Rockwell "C") provide practically complete protection against damage from hammer blows, wrench-dropping, mishandling, and similar occurrences. ***Available from Miller at no extra cost.***

The HARD CHROME PLATING over the case-hardened rods protects against scratch-damage and rust. ***Available from Miller at no extra cost.***

Specify "TEFLON" WIPERS

On all Air and Hydraulic Cylinders

Benefits To You

"TEFLON" Rod Wipers and "TEFLON" Hydraulic Piston Rod Seals withstand temperatures from—100°F. to plus 500°F. They are impervious to practically all known chemicals, including the fire-resistant, special, and standard hydraulic fluids in current use. ***Available from Miller at no extra cost.***

Specify TEFLON HYDRAULIC ROD SEALS

On all Hydraulic Cylinders

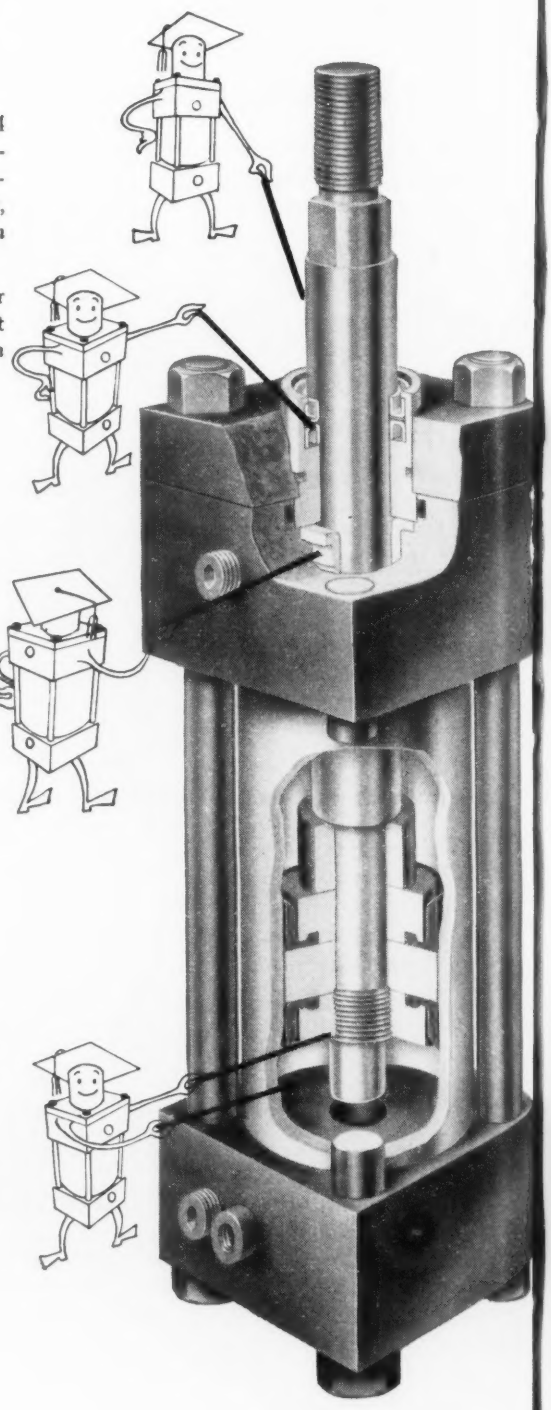
Specify RUST RESISTANT SURFACES

On all Air and Hydraulic Cylinders

Benefits To You

Highest quality Black Ferric Oxide Finish provides rust protection in air cylinder operation and on all cylinders during shipping and installation.

Cylinder heads, caps, mountings, pistons, followers, tie rods, and the unplated portions of the piston rods have this finish ***at no extra cost on all Miller cylinders.*** (This finish not recommended for water service)



You may wish to route this entire page to the proper department in your company, by using this handy form. Additional copies on request. →

To (Dept.)_____

"On all our future cylinder requirements, please specify the above quality features."

Signed_____

Title_____

NOTE. On all Miller Hydraulic Piston Seals: Leather Cup Seals are *standard.* Piston Ring Seals are optional at *no extra cost,* and "Teflon" Cup Seals are available *at extra cost.*

Member of the National Fluid Power Association

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • TOLEDO • CINCINNATI • COLUMBUS
PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY
BUFFALO • ROCHESTER • MINNEAPOLIS • GRAND RAPIDS • DETROIT • FLINT
FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE
KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE
DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • ATLANTA
TORONTO, CANADA and OTHER AREAS

Miller

MILLER FLUID POWER DIVISION FLICK-REED CO.

2034 N. Hawthorne Ave. Melrose Park, Ill.

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULAT

Only COLEMAN TOWER® OVENS

provide all these major advantages

INCREASE PRODUCTIVITY

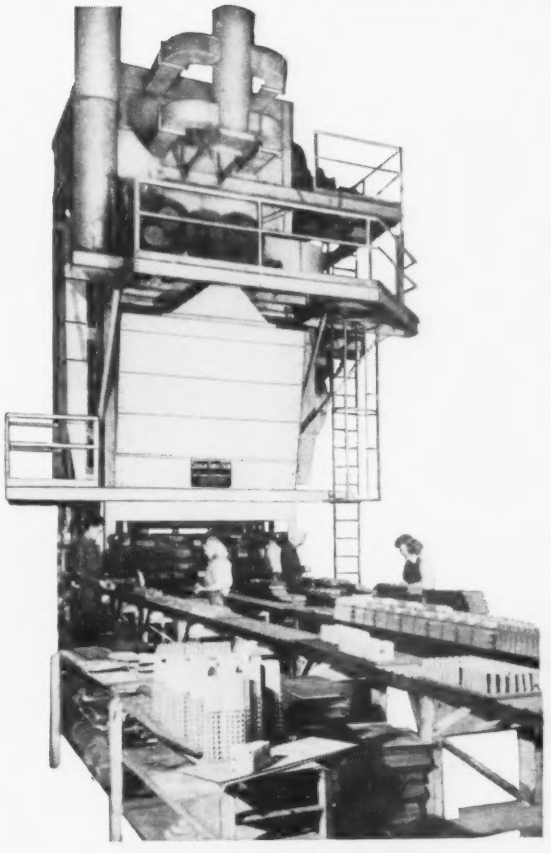
Savings through consistent, dependable production of perfectly baked cores; eliminating rejects, makeovers and casting losses due to improper core baking.

SAVE SPACE

Vertical design permits saving of approximately 75% of floor space over batch ovens of the same capacity. Cores are "smoked-off" and cooled before leaving unloading station.

REDUCE MAINTENANCE

Heavy duty construction for continuous, dependable performance and economical operation reduces maintenance cost to a minimum.



Coleman Tower ovens use only 25% of floor space required by batch type ovens of same capacity.

SAVE TIME

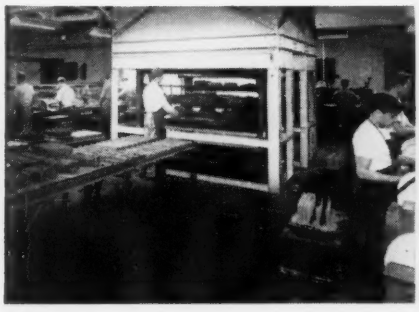
Cores of widely different sizes and shapes can be handled at the same time, all baked with consistent uniformity. Trucks, racks and money-wasting handling methods are eliminated.

SAVE BINDER

Proper core baking atmosphere and uniform temperature provide sizeable savings in conventional or high speed binders.

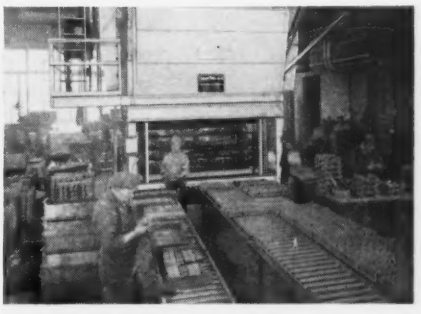
SAVE FUEL

The recovered heat is used over again, thus yielding important fuel saving. The most economical fuel available to you can be conveniently used.



Patented Open Center permits close, efficient grouping of coremakers around the oven... results in increased coremaker productivity.

3-way loading feature increases accessibility 300% over ordinary vertical oven designs.



Recuperative cooling system "smokes-off" and cools the cores before they reach unload station.

Coleman Tower Ovens are the most widely used continuous core baking ovens in the foundry industry. They have brought the advantages of mechanization to large and small foundries and have made important cost reductions. Why not find out whether Coleman Tower Ovens can bring the same savings to you? Our engineers are available without obligation to make practical recommendations for your particular requirements...call or write today!

WRITE FOR BULLETIN 54

A COMPLETE RANGE OF TYPES AND SIZES

for every core baking and mold drying requirement:

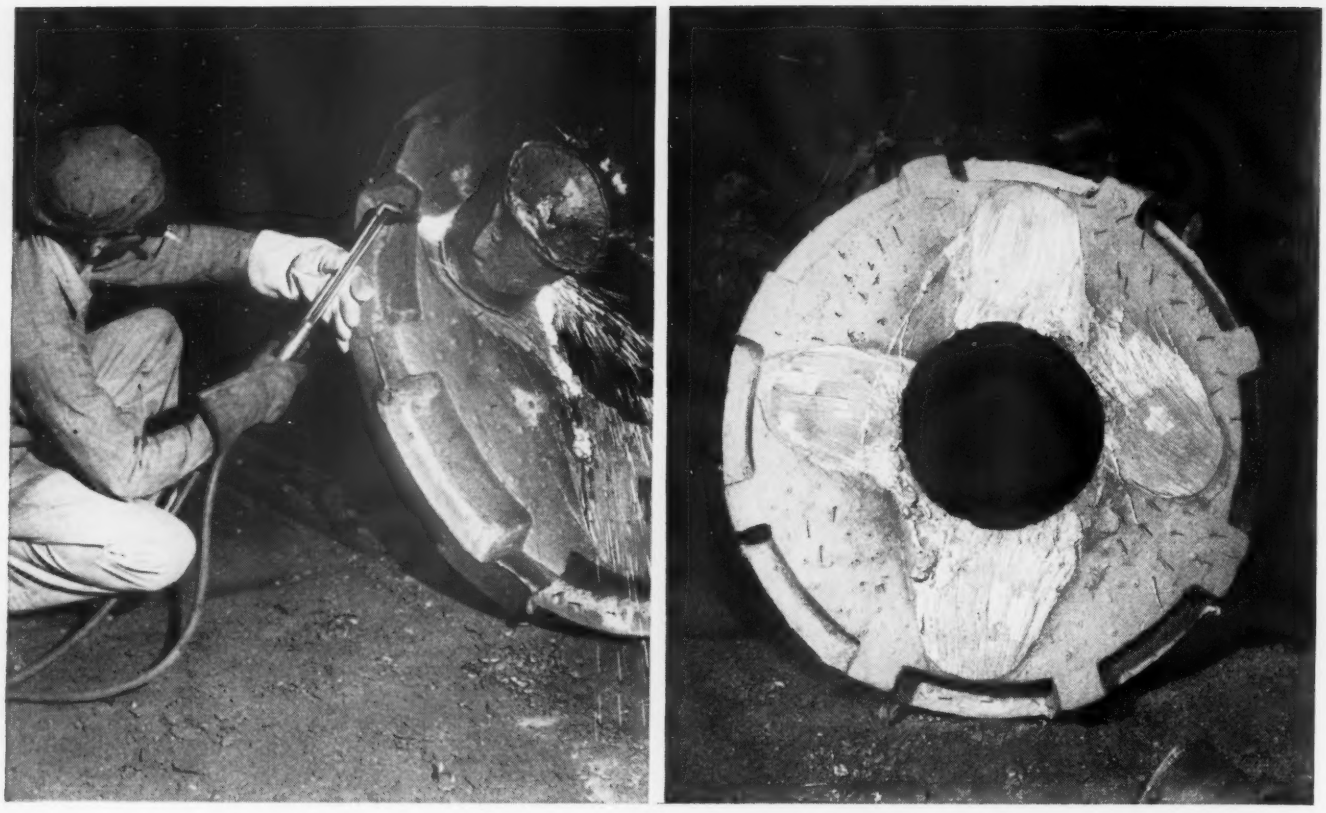
Tower Ovens • Horizontal Conveyor Ovens
Car-Type Core Ovens • Car-Type Mold Ovens
Transrack Ovens • Rolling Drawer Ovens
Portable Core Ovens • Portable Mold Dryers
Dielectric Core Ovens

THE FOUNDRY EQUIPMENT COMPANY

1821 COLUMBUS ROAD **CLEVELAND 13, OHIO**

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

Circle 600 on Inquiry Card—Page 255



total time . . . six minutes

Why more and more foundries are using Airco torches for removing risers

The above sequence of photos is a typical case. It took the operator only 1½ minutes to cut each of the 9″ diameter risers off this heavy casting using an Airco #9000 torch equipped with a size 10, style 164 Airco tip. Finished — the operator simply moved on to the next job. No castings had to be moved — thanks to the portability of the Airco torch. Grinding time reduced to a minimum.

Foundrymen are also discovering the versatility of Airco torches. Using *Genuine* Airco tips, many torch models can be quickly and easily converted for gouging, descaling, flame-hardening, scarfing and many other general foundry jobs.

It's easy to get complete information on all Airco torches and tips. Just contact your nearest Airco office or authorized Airco dealer. Ask for a free copy of catalog 818.

welding
AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .

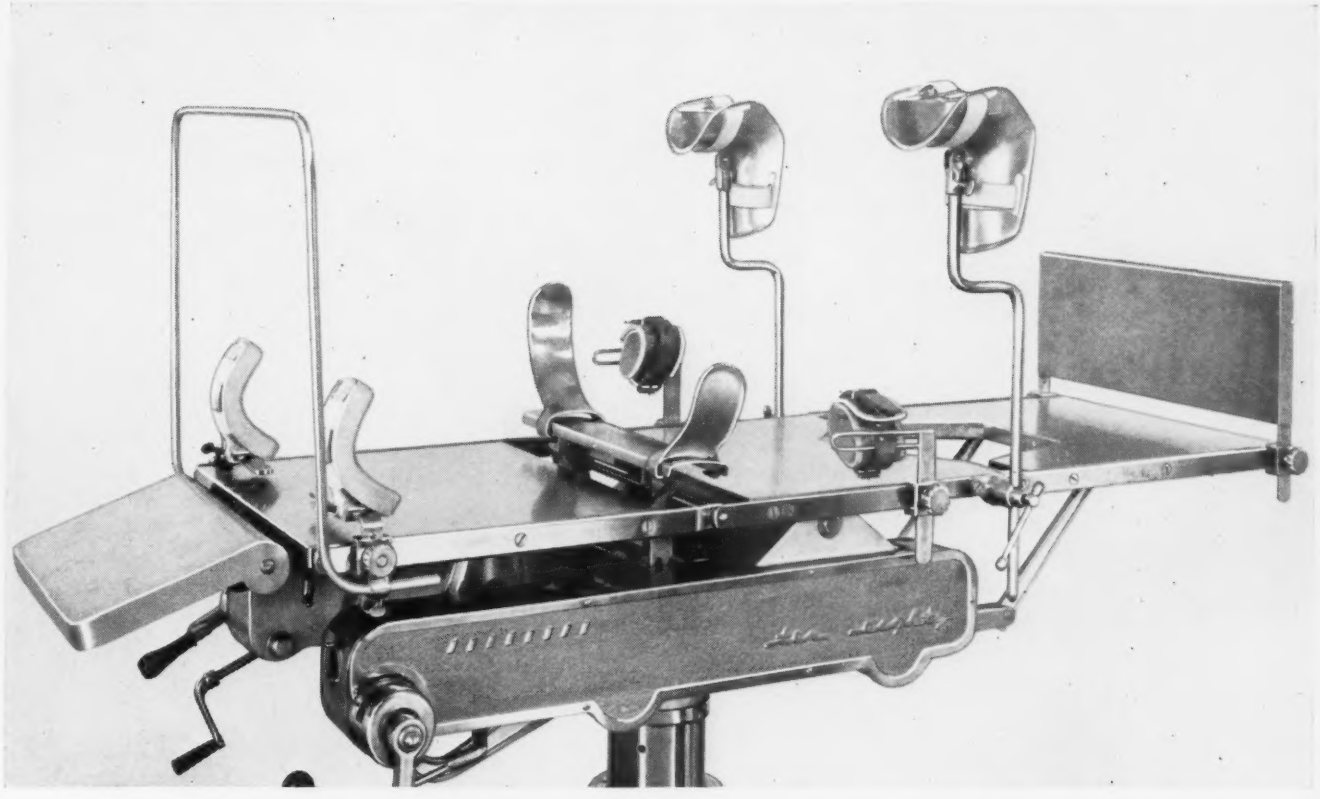
AIRCO®
Offices and dealers in most principal cities

AIR REDUCTION SALES COMPANY
A division of Air Reduction Company, Incorporated, New York 17, N. Y.

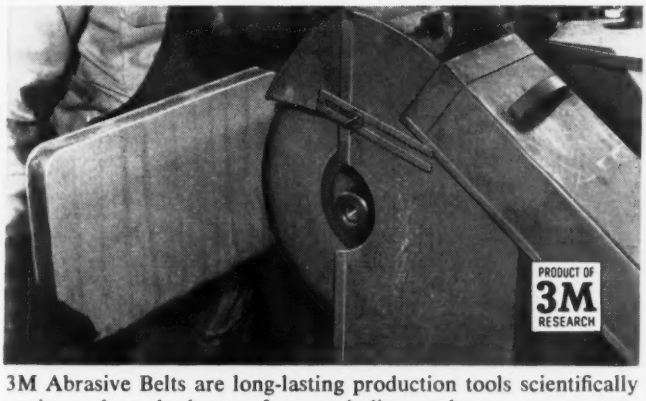
On the west coast — Air Reduction Pacific Company
Internationally — Airco Company International
In Cuba — Cuban Air Products Corporation
In Canada — Air Reduction Canada Limited

Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols, and other synthetic resins.

3M METHOD–better from start to finish



3M Abrasive Belts increase production 25% on finishing of surgical table parts



3M Abrasive Belts are long-lasting production tools scientifically engineered to do better, faster grinding at lower cost to you.

American Sterilizer Co., Erie, Pa., made this saving when they switched to the Abrasive Belt Method for removing nibs, burrs and other imperfections from brass and aluminum castings. This company formerly used set-up wheels – a slow, costly method. When they switched to the 3M Method using Three-M-ite Resin Bond Cloth Belts, production on all the above castings jumped 25% with far superior pre-plating finishes. The 3M Method can help *you* increase production and cut costs in *your* foundry. Call your 3M Representative *today* or send coupon below.

3M ABRASIVES

Send today for FREE Booklet:

MINNESOTA MINING AND MANUFACTURING CO.
Dept. CN-116, St. Paul 6, Minn.

☐ Send me free booklet: "Grinding & Finishing Non-ferrous Metals with 3M Abrasives"

☐ Please have 3M Representative call

*Name*_____ *Title*_____

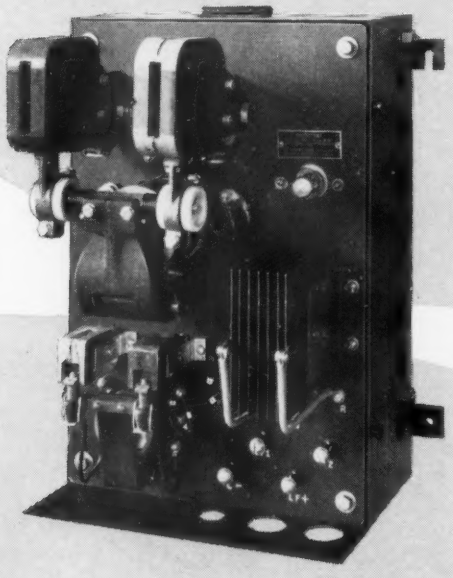
*Company*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

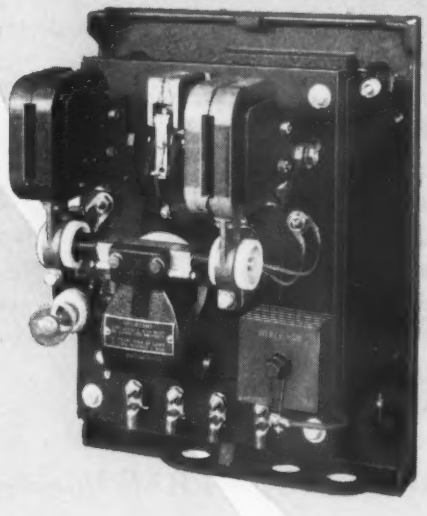
Ohio RD2 Controller (case not shown)



for better performance
it's Ohio Magnets—
especially when used with

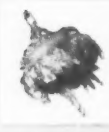
OHIO MAGNET CONTROLLERS

Ohio RD1 Controller (case not shown)



Size for size, Ohio Magnets lift larger loads over longer periods—*particularly when used with Ohio Magnet Controllers.* For Ohio Magnet Controllers are of the high-efficiency, instantaneous-discharge type for any standard or special line voltage from 36 to 250 volts DC. Specify Ohio RD1 Controllers for 35-100 amps, Ohio RD2 Controllers for 75-150 amps—and get better magnet performance. Check Yellow Pages for your nearest Ohio Electric representative or contact Ohio plant for full information.

AA-3968

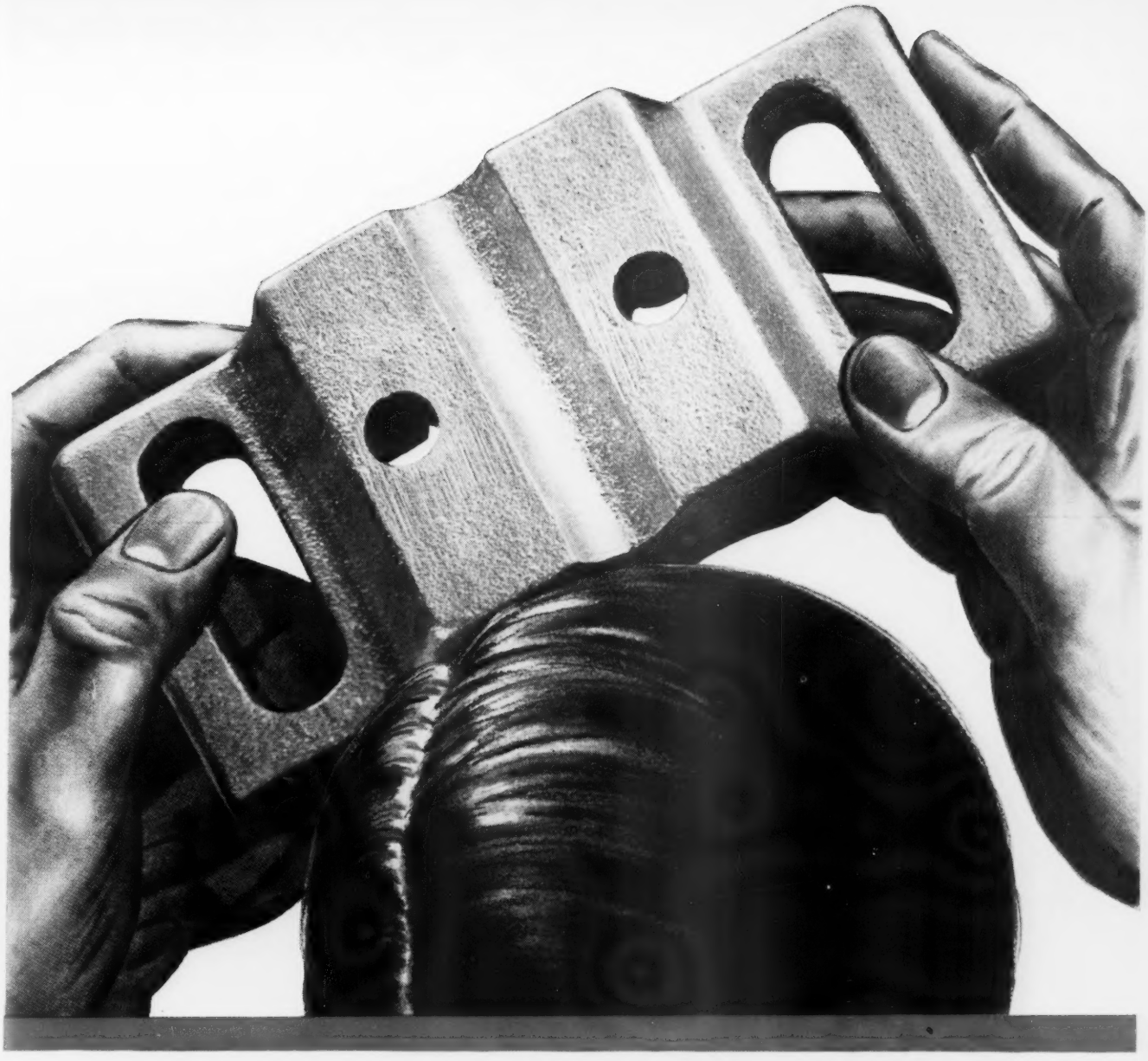


ohio ELECTRIC

Chester Bland
President

THE OHIO ELECTRIC MFG. CO.
5400 Dunham Road • Maple Heights • Cleveland, Ohio

Ohio Also Makes Separation Magnets
Nail Making Machines • Fractional
Horsepower, Shell and Torque Motors



He has to see for himself!

When it comes to blast cleaning, a foundryman can't believe claims and promises. He has to see for himself the kind of finishing job an abrasive does. His next question is: What does it cost in operation? Different jobs may require different abrasives but the result should always be the same—the best job at *lowest* cost. Malleabrasive and Tru-Steel abrasives give you that. Whichever you need, Pangborn has the right abrasive for your job. Talk to one of our sales engineers, or write PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Maryland.

2A

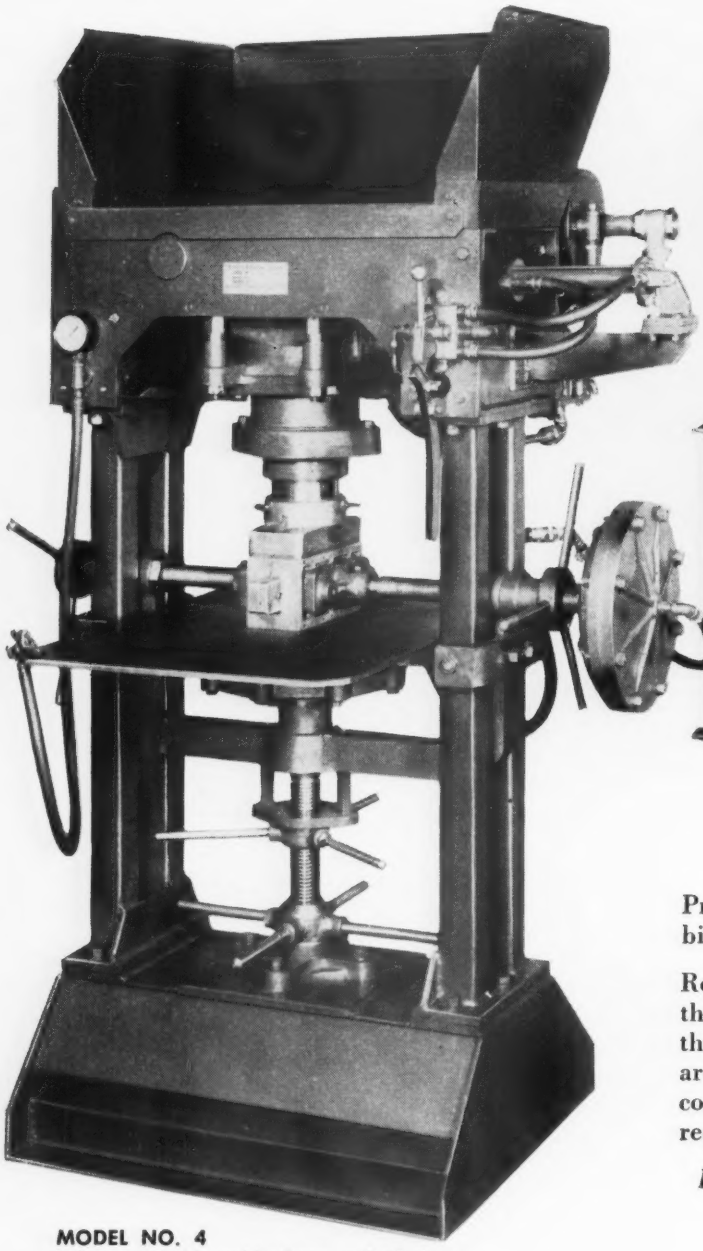
Pangborn DISTRIBUTORS FOR

MALLEABRASIVE® AND

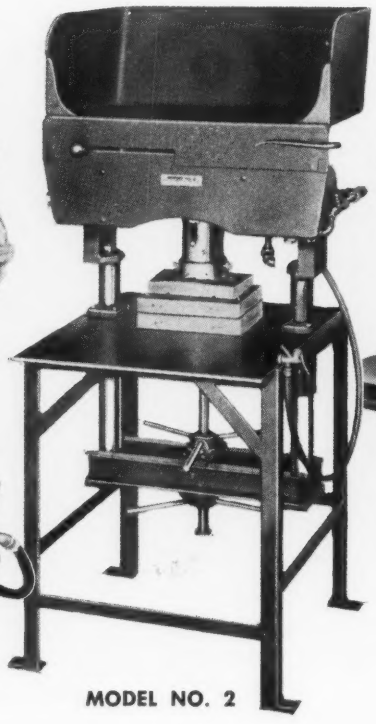
TRU-STEEL SHOT

Circle 604 on Inquiry Card—Page 255

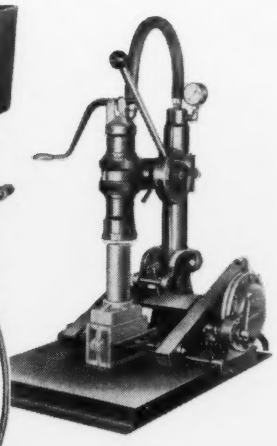
Redford CORE BLOWERS



MODEL NO. 4
(Also available with draw cylinder)



MODEL NO. 2



BENCH TYPE

Proven performance — simplicity — flexibility — power — speed.

Redfords are keeping pace with progress in the foundry. From the first bench type to the new No. 4 . . . all Redford Core Blowers are designed to meet your demand for better cores at lower cost, regardless of production requirements.

For complete information, write for our detailed literature.

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • DETROIT 23, MICHIGAN • PHONE: KENWOOD 1-8611

Circle 605 on Inquiry Card—Page 255

Circle 606 on Inquiry Card→

Even truer today

We ran this **B&W Insulating Firebrick** advertisement in 1947

24 years now

Photo courtesy Sun Shipbuilding & Dry Dock Company

Only in main arch approximately 2 feet from each end of the furnace

The furnace that PAID FOR ITSELF MANY TIMES OVER

Still lined with its original B&W Insulating Firebrick after 15 years of normalizing and stress-relieving service, this furnace is giving exceptional performance. Despite the added strain of the rigorous war years, the 80,000 B&W IFB used to line sides, ends and arch have required no appreciable maintenance!

It is no wonder the operators can report:
"This furnace has paid for itself many times over."

For furnace performance that assures highest production at lowest cost, even after years of grueling service, you can always count on lightweight B&W Insulating Firebrick. Your local B&W Refractories Engineer will be glad to help you select economical B&W Refractories for your furnaces.

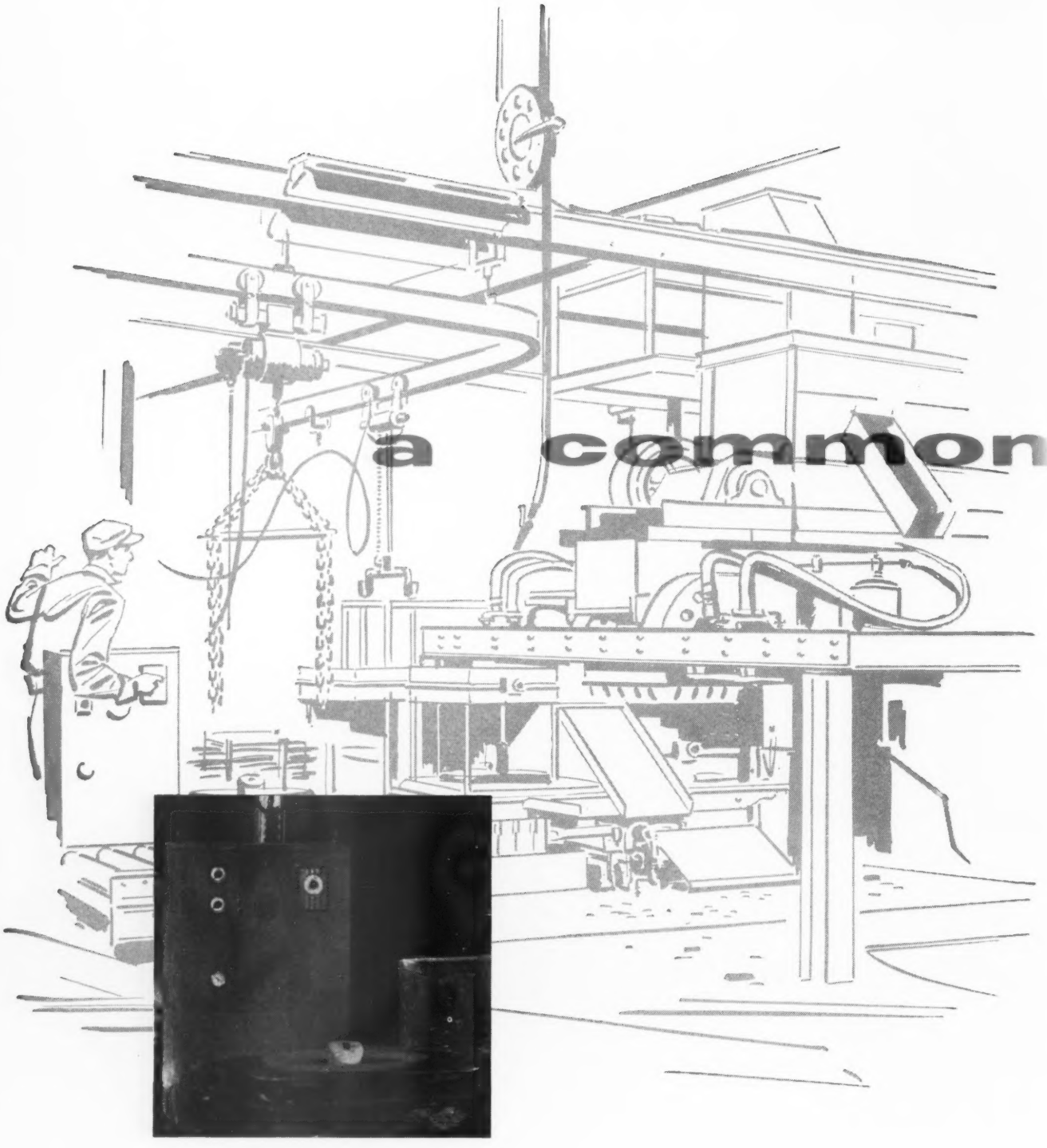
B&W REFRACTORIES PRODUCTS:

B&W Allmul Firebrick • B&W 80 Firebrick •
B&W Junior Firebrick • B&W Insulating Firebrick
B&W Refractory Castables, Plastics and Mortars
B&W Silicon Carbide

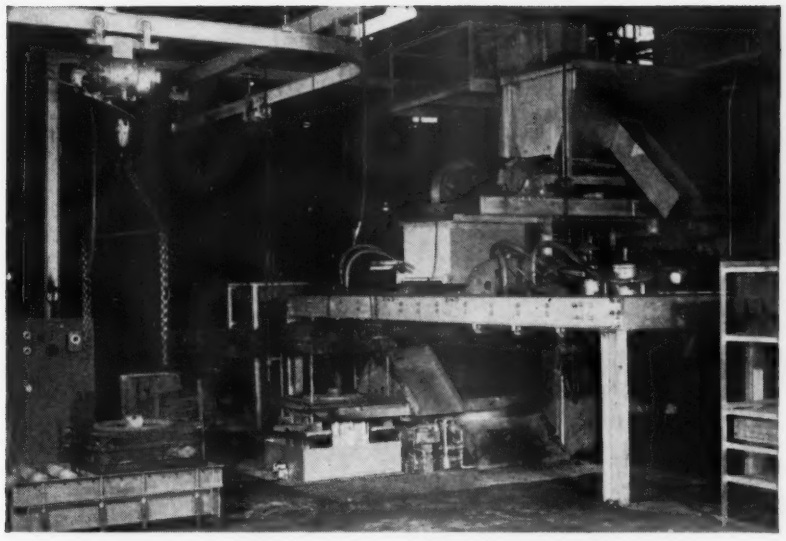
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42ND ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R550



THE HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.



goal

Since World War II foundries in every section of the country have purchased more than 27,000 molding machines.

The big reason for the new look? COMPETITION.

To keep in step, progressive jobbers and giant production shops alike follow one king sized formula: "Rig" the foundry with streamlined methods and modern, cost-cutting machinery.

In this respect it is a tradition with Herman to lead the way.

For example, in St. Paul, Minnesota the American Hoist & Derrick Company recently installed the new Herman Stationmaster illustrated on the right. (It's an automatic, two station, indexing type jolt, squeeze, strip machine.)

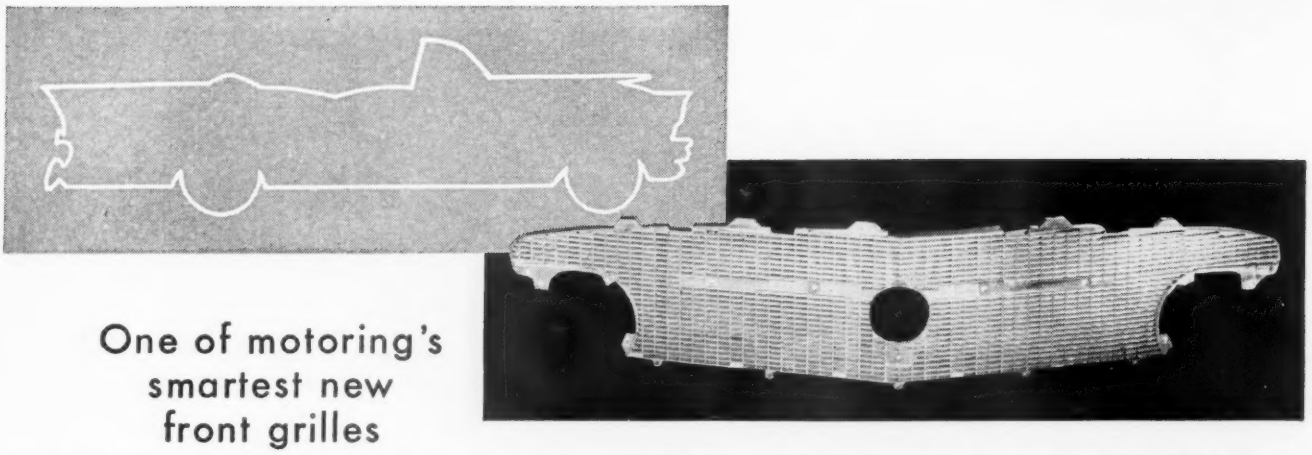
This Herman machine should be amortized in just ONE YEAR. It has increased planned production of 300 half molds per shift to over 600 within the first three months of operation — despite daily requirements for 25 pattern changes per shift. With this increased production only three men are required to handle every operation in the molding cycle preliminary to pouring.

Write for detailed literature.

HERMAN

Best Known Name in Molding Machines

Circle 607 on Inquiry Card—Page 255

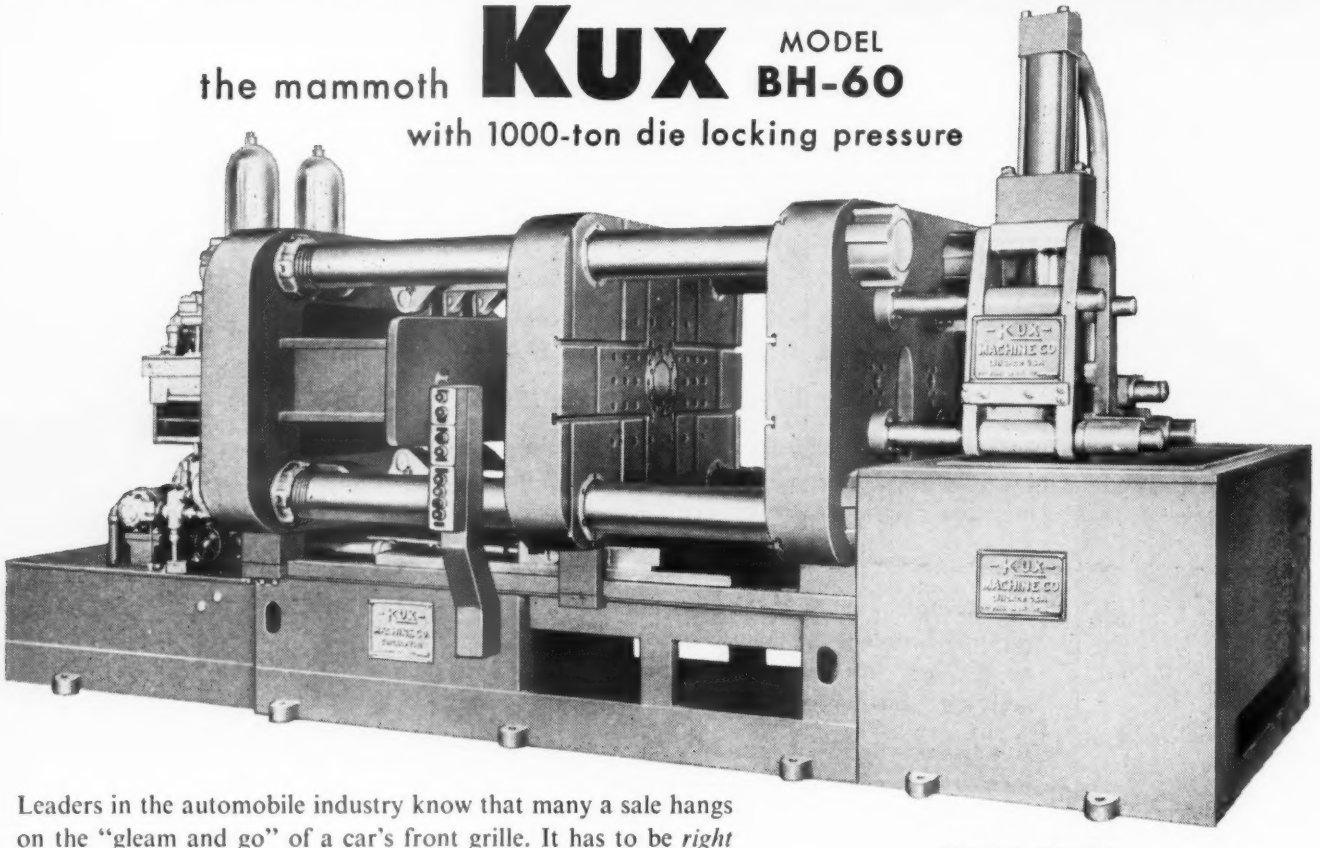


One of motoring's smartest new front grilles

cast on America's outstanding die casting machines

the mammoth **KUX** MODEL **BH-60**

with 1000-ton die locking pressure



Leaders in the automobile industry know that many a sale hangs on the "gleam and go" of a car's front grille. It has to be *right* for looks, for strength, for serviceability. And equally important, it must be engineered to allow for speed of production.

That's why the industry's top designers depend upon Kux quality die casting equipment to turn out the handsome new front grille illustrated above.

The grille weighing 24 lbs. in zinc, cast in one piece, measures 59″ x 12″ and is produced at an average speed of 80 per hour. The die, in which this part is made, is 70″ x 50″, and requires tremendous pressure to keep it locked under the force of the metal being injected. Therefore, the BH-60 machine having 1000 tons die locking capacity is utilized for this all powerful job.

Through the years, innumerable other leading manufacturers and die casters have profited from their acquaintance with the advanced die casting machines perfected by KUX. Why shouldn't you?

MODEL BH-60

Kux Hydraulically Operated Plunger Gooseneck Die Casting Machine for the Production of Lead, Tin or Zinc Castings

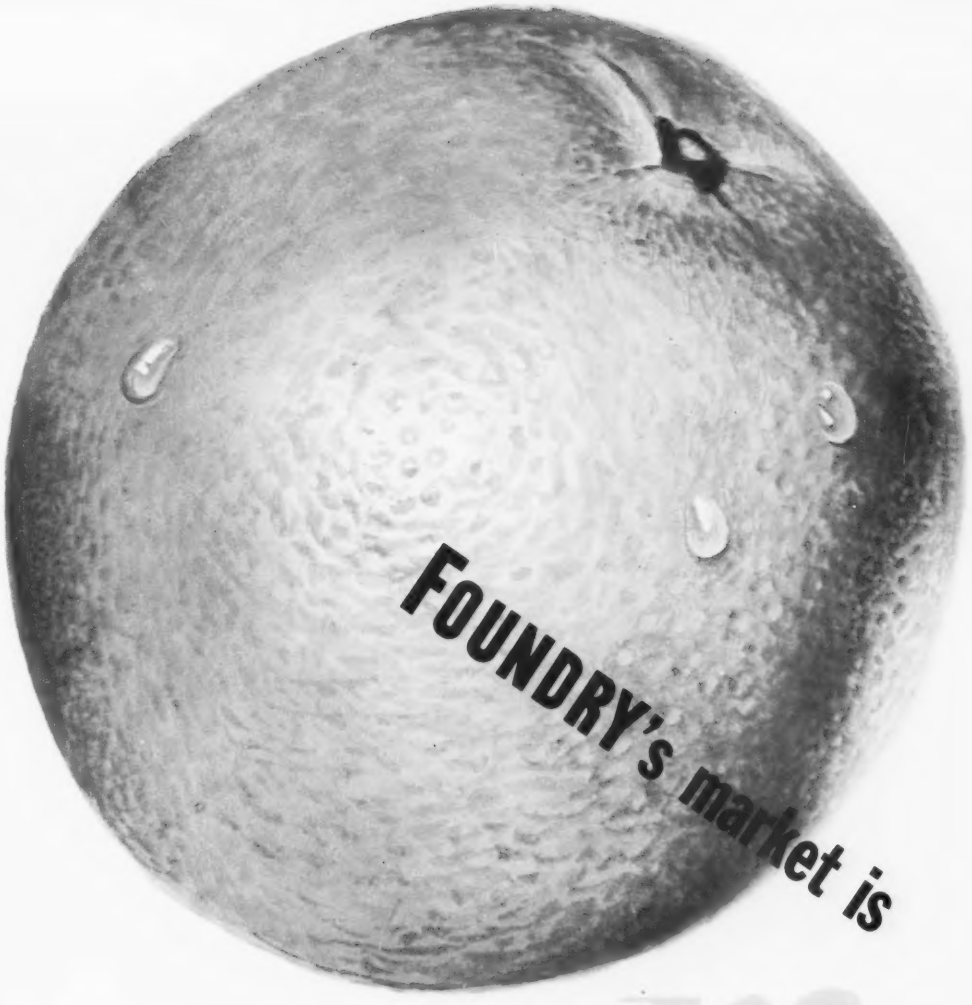
Also Available as HP-60, a Cold Chamber Model for the Production of Aluminum, Brass or Magnesium Castings

KUX

MACHINE COMPANY

6725 North Ridge Avenue, Chicago 26, Ill.

Builders of a full range of die casting machines... from 25 tons to 1000 tons in size.

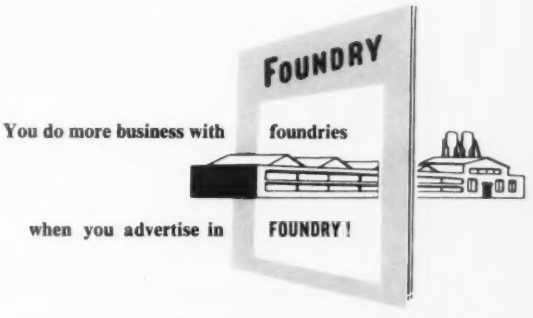


Foundries are shooting for a new goal of 21 million tons annual output by 1960. They must equip now.

FOUNDRY readers spend over $120 million a year to fight obsolescence, improve efficiency and over $1 million *an hour for materials* to meet today's demand for higher quality castings.

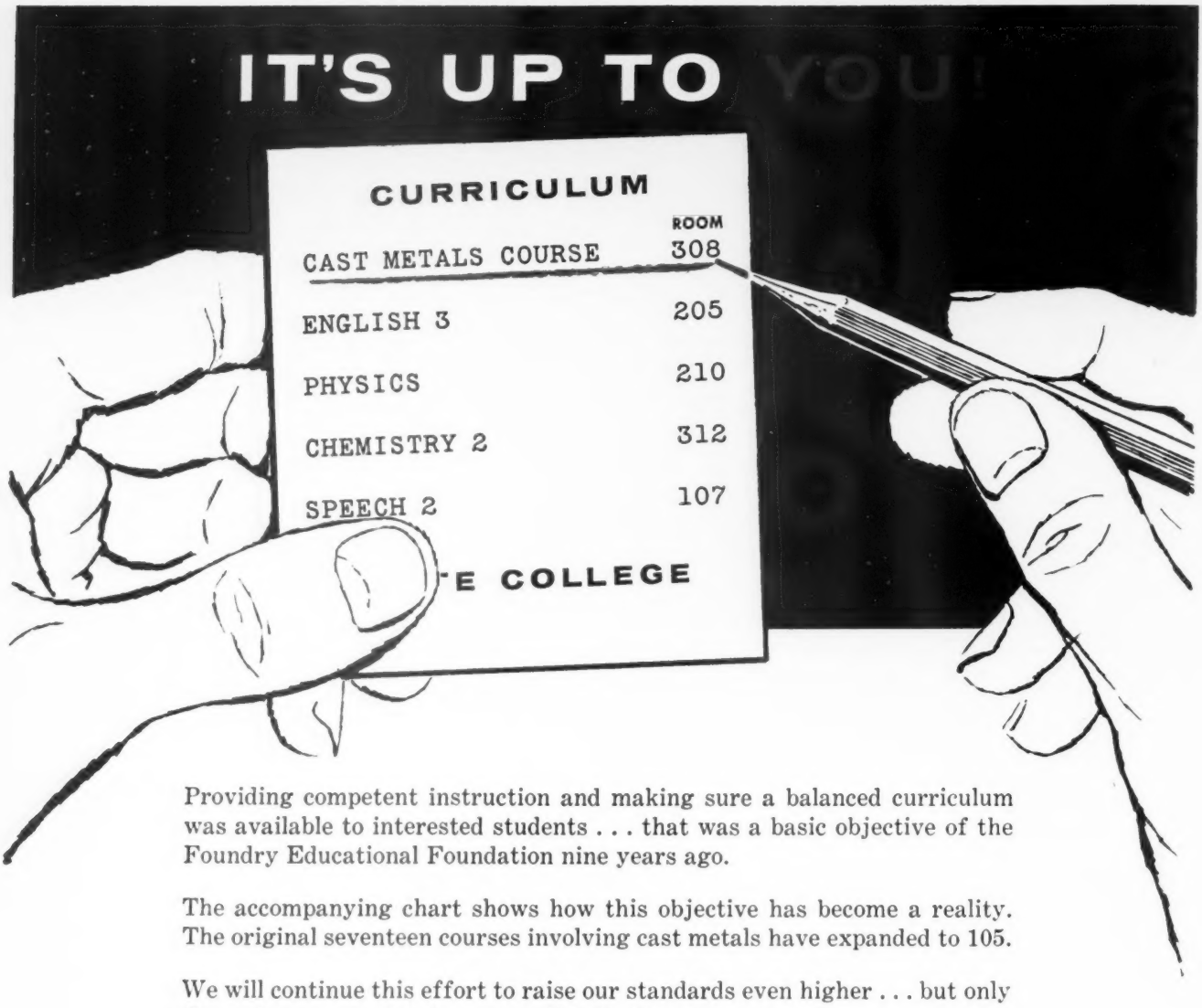
Huge replacement market is accelerated by the fast rate of wear-out in foundry equipment.

Market selling help is available to you through FOUNDRY's complete Sales Development Service. Write for more information on this result-getting program.



a PENTON Publication / Penton Building, Cleveland 13, Ohio

IT'S UP TO YOU!



Providing competent instruction and making sure a balanced curriculum was available to interested students . . . that was a basic objective of the Foundry Educational Foundation nine years ago.

The accompanying chart shows how this objective has become a reality. The original seventeen courses involving cast metals have expanded to 105.

We will continue this effort to raise our standards even higher . . . but only through **you** can this be accomplished. Your interest and encouragement and specific dollar support are needed. It's up to **you.**

FOUNDRY COURSES AVAILABLE

17 1947

105 1956

To learn more about F.E.F. and its endeavors to help you to help the castings industry, write for our new booklet, "Let's Look Ahead".

You'll be glad you did.

Foundry Educational Foundation

1138 TERMINAL TOWER BUILDING • CLEVELAND 13, OHIO

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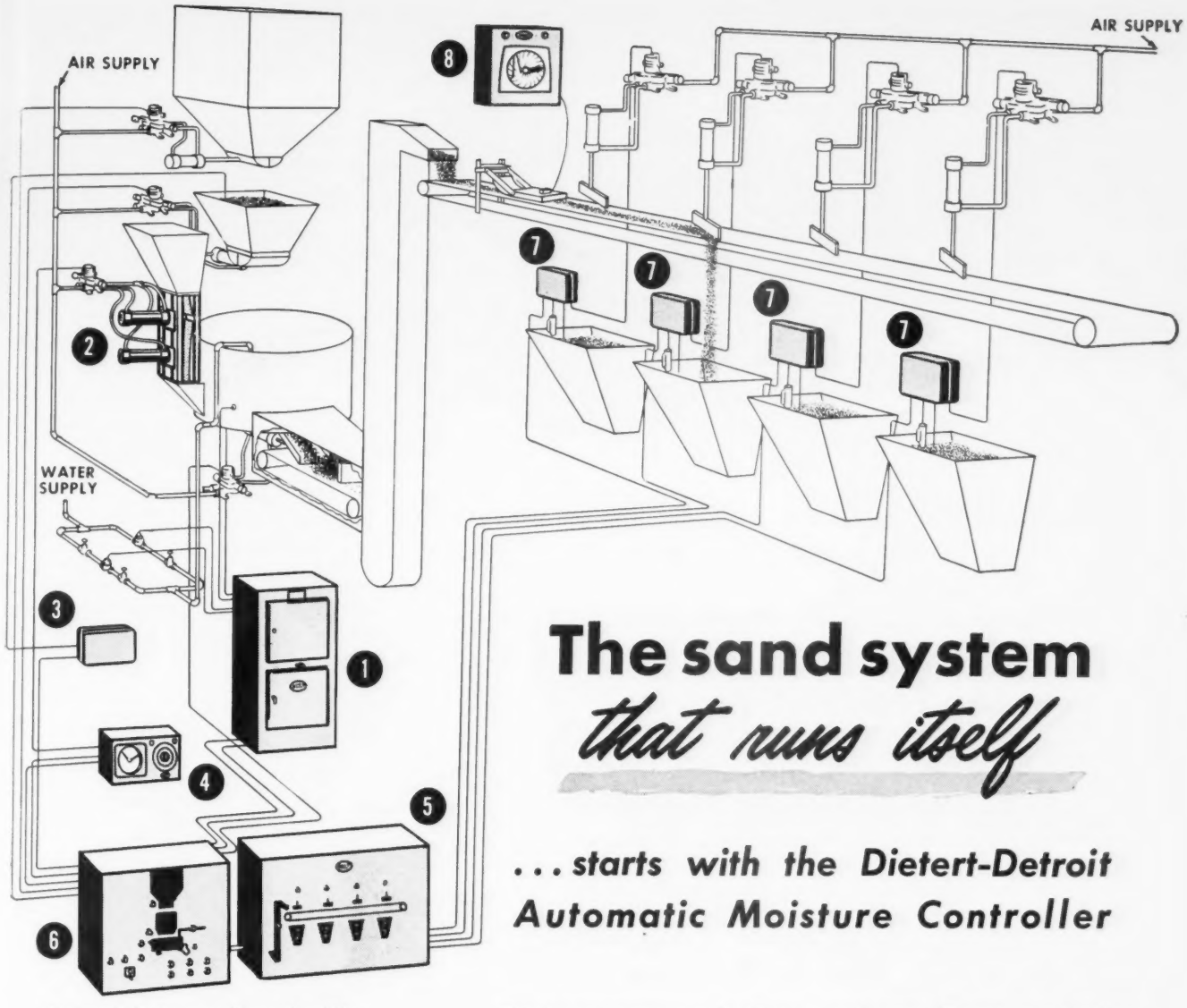


The sand system *that runs itself*

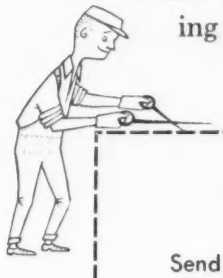
...starts with the Dietert-Detroit Automatic Moisture Controller

Completely equipped with

DIETERT-DETROIT CONTROLS

1. **END POINT AUTOMATIC MOISTURE CONTROLLER** (**No. 3907**) assures highly accurate moisture control through continuous measurement during mixing cycle.
2. **BONDADDER** (**No. 3888**) automatically measures correct amount of dry materials and discharges to muller.
3. **RETURN-SAND HOPPERTROL** (**No 3897**) automatically controls level of return sand in hoppers, bins, etc.
4. **BONDADDER IMPULSE UNIT** automatically extends each measurement cycle of the Bondadder to any desired quantity of dry material.
5. **SAND MONITOR** (**No. 3883**) automatically coordinates sand mulling and distribution.
6. **AUTOMULL** (**No. 3884**) mechanically supervises and controls complete mixing cycle.
7. **TEMPERED SAND HOPPERTROL** (**No. 3911**) automatically controls level of tempered sand in hoppers, bins, etc.
8. **MOIST RECORDER** (**No. 3887**) tests and records moisture content of sand traveling on conveyor (as shown) or in bin or hopper.

Eliminate guesswork. Cut scrap losses. Boost production. A Dietert-Detroit controlled system will do 99% of the work *itself*, 99% of the thinking *itself*. Now is the time to modernize your foundry and watch your profits climb. Modern sand control will enable you to consistently produce top quality castings . . . on schedule . . . and without that old-fashioned watching, worrying and wondering! Send coupon now for details.



HARRY W. DIETERT CO.

9330 Roselawn Detroit 4, Michigan

Send me details on the following:—

☐ Dietert-Detroit Automatic Moisture Controller

☐ Complete Automatic Sand System

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

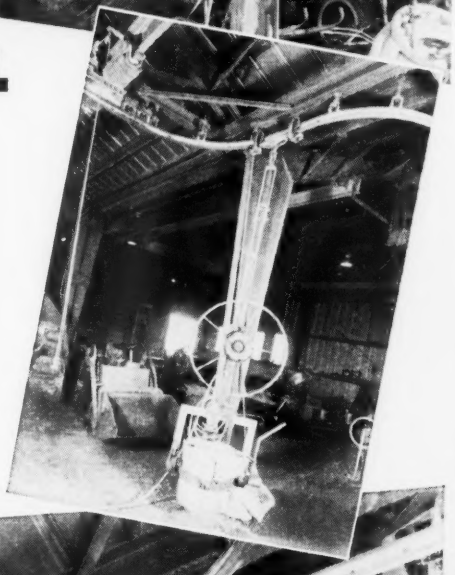
Circle 610 on Inquiry Card—Page 255

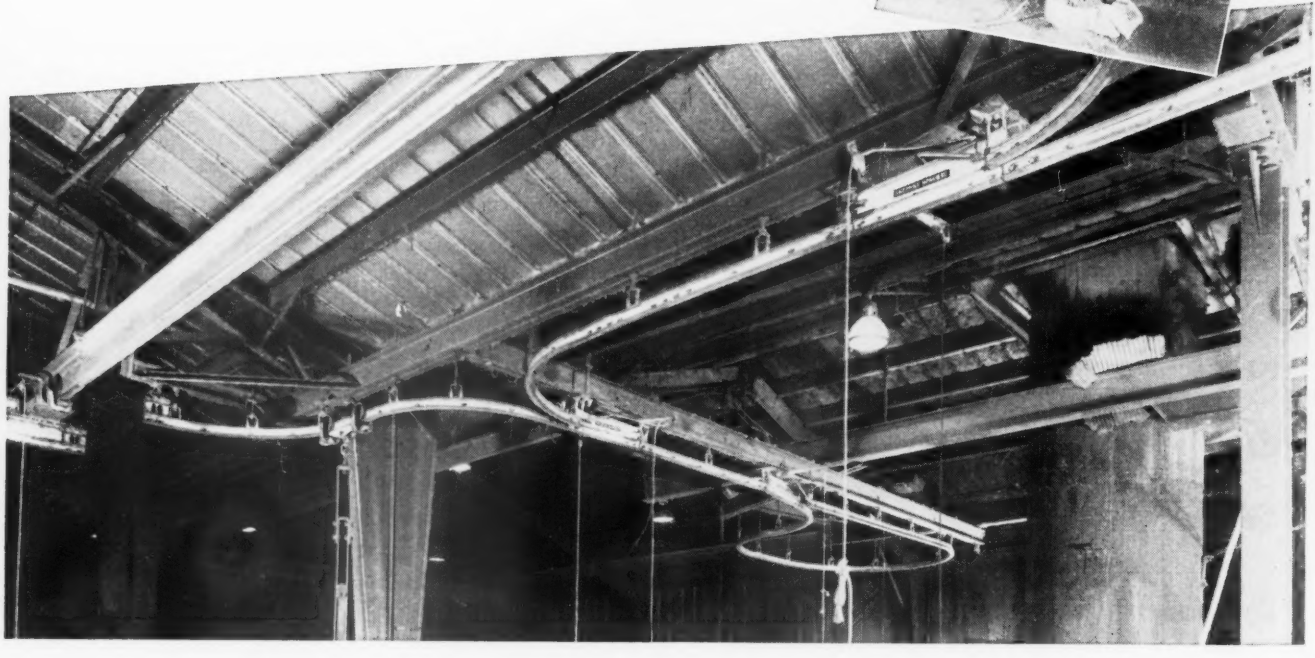
AMERICAN MONORAIL
in Rigid Frame Buildings

A low cost foundry operation can be maintained by application of American MonoRail track and crane systems within a rigid frame type building.

American MonoRail advantages include easy handling, smooth travel, power operation, safe interlocking for loads up to 5 tons.

This is another application of "know-how" by American MonoRail engineers. Let them help solve your problem. Write for Bulletin BPD-1.





Member of Materials Handling Institute • MonoRail Association

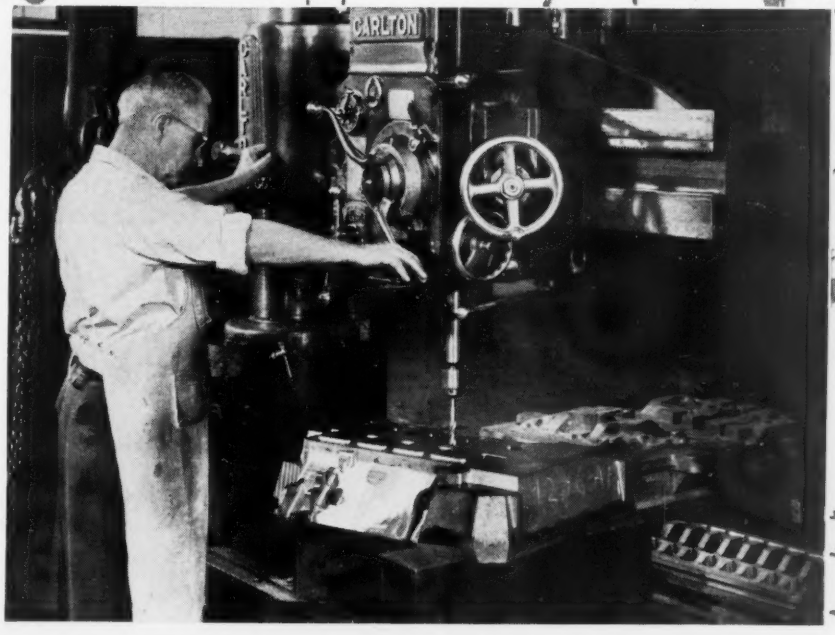
AMERICAN MONORAIL COMPANY

OVERHEAD HANDLING EQUIPMENT

13104 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

Circle 611 on Inquiry Card—Page 255

LET US TELL YOU ABOUT OUR OPERATION



Rugged, versatile equipment manned by craftsmen of long experience maintains the Pyle reputation for flawless patterns delivered on schedule. This Carlton Radial Drill plays an important part in the flow of patterns for high production castings through the integrated Pyle operation.

Patternmaking at Pyle may not embrace all the drama of surgery . . . but pinpoint precision and devotion to detail are just as important here as in the operating room.

At Pyle your pattern is prepared by men averaging 19 years experience. From a minutely accurate wooden model, it is cast in our own foundry — designed, equipped and operated exclusively for pattern production. The aluminum or magnesium casting is then tooled on machines best suited to your needs . . . lathes, radial drills, milling machines, planers, hydraulic or automatic duplicators. Flawlessly hand-finished and meticulously inspected, it is shipped to meet your deadline.

The consistent thoroughness of our operation has won us friends among America's most respected firms. May we become friends with you?

PYLE

PATTERN AND MANUFACTURING COMPANY

Muskegon, Michigan

Circle 612 on Inquiry Card—Page 255

this man uses radiography for product control

$80 a month
invested in equipment
SAVES him thousands
a year in needless rejects
...his customers are *happy*

this man doesn't

high reject rate
(correctable by radiography)
COSTS him thousands
a year in needless waste
...his customers *howl*

Makes no difference what you make or buy or sell...
if it needs "seeing into" for quality control, radiography (gamma or x-ray) can probably profit you, as it does others.

Talk it over with your local Picker representative *
or write us outlining your problem and, if possible, sending typical samples. We'll make tests and tell you frankly whether radiography holds any promise for you.

Costs you nothing to find out...
maybe it's costing you a great deal right now NOT TO.

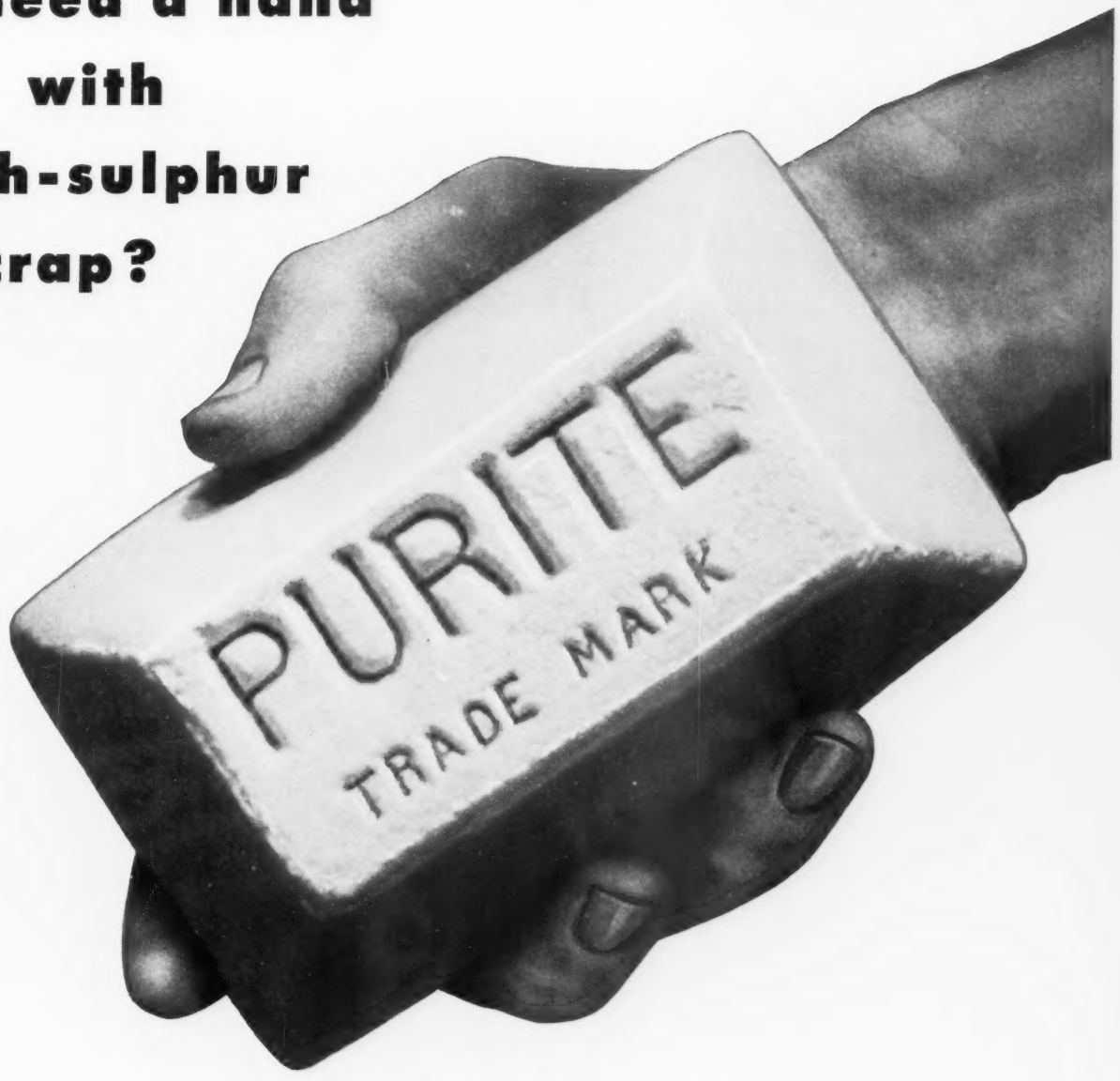
Picker x-ray

PICKER X-RAY CORPORATION
25 South Broadway, White Plains, N. Y.

*There's probably a Picker district office near you (see local 'phone book).

Picker... your one Source for Everything in Radiography and Fluoroscopy

need a hand with high-sulphur scrap?



Your best antidote for high-sulphur scrap is Purite. Used in the cupola and in the ladle, Purite assures cleaner iron and adds to the soundness, strength and machinability of the finished castings.

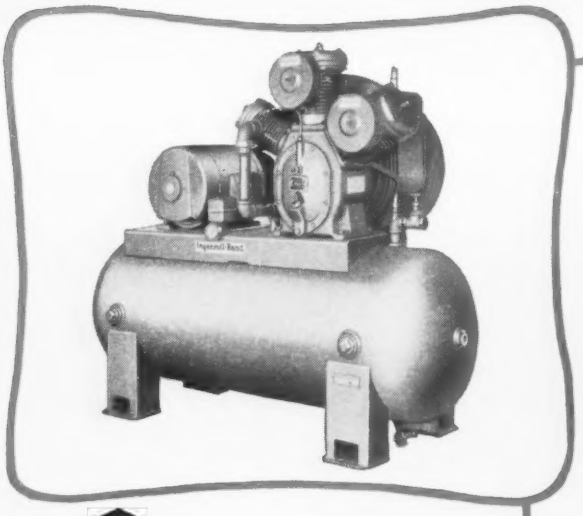
In the cupola, Purite can produce a sulphur reduction as high as 25% . . . in addition to increasing the fluidity of the cupola slag, speeding combustion reactions, and preventing bridging. In the ladle, Purite desulphurizes the iron to specification and provides clean, quiet-pouring metal of uniform analysis.

For over 30 years, Purite has been the choice of progressive foundrymen. The convenient 2-pound pigs of fused soda ash are familiar everywhere. Purite is distributed by leading supply houses in every area . . . for the name of the one nearest you or further information, write—

MATHIESON

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

3875



Type 30... A 15 horsepower unit mounted on receiver. Other units, ½ to 20 horsepower.

Type 40 ... This 125 horsepower Motor-compressor has built-in motor drive. Other sizes from 25 hp.

from ½ to 125 horsepower

AIR-COOLED COMPRESSORS

give you these important advantages

Wherever you need dependable, low-cost air power in the ½ to 125 horsepower range, Ingersoll-Rand air-cooled compressors offer attractive savings. Installation, operating and maintenance costs are low. These units are completely air-cooled—no water piping or jackets to clog, no water to freeze. Multi finned-tube intercoolers with forced-draft cooling keep compression efficiency high. Ask your Ingersoll-Rand representative for full information.

TYPE 30 — ½ to 20 horsepower ... These compressors with their outstanding 'Balanced-V Construction' have become first choice among all who look for top operating efficiency combined with low-cost maintenance. Each combination of cylinder sizes is designed to give the most compressed air at the desired pressure; single stage units for 40, 60 or 80 psi; two-stage units for 125, 200 or 250 psi. Type 30 compressors are available as tank mounted, baseplate mounted or bare compressor units. They offer unique money saving features not found in other units.

TYPE 40 — 25 to 125 horsepower ... These efficient two-stage, air-cooled units are available with three types of drive; built-in electric motor, flexible-coupled or V-belt. Dual control permits choice of constant speed or automatic start-stop control. Available for discharge pressures ranging from 80 to 200 psi. Channel Valves are efficient, quick-acting and air-cushioned for quiet operation and long service life.

Install Anywhere

- no danger of freezing
- no special foundation
- small floor space

Low-Cost Operation and Upkeep

- no cooling water required
- low maintenance
- regulation to meet requirements

Efficient Compression

- liberal valving
- large capacity intercooling
- high mechanical efficiency

Ingersoll-Rand

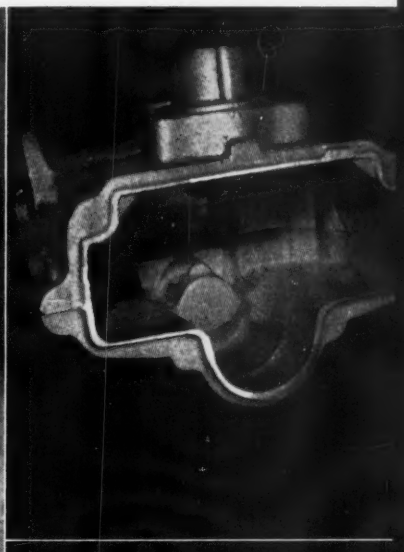
1-448 11 Broadway, New York 4, N. Y.

COMPRESSORS • CONDENSERS • AIR & ELECTRIC TOOLS • PUMPS • ROCK DRILLS • GAS & DIESEL ENGINES

Circle 615 on Inquiry Card—Page 255

New RESINOX* Cold Coating Resins—

free-flowing, non-dusting, easy-mixing!



Monsanto's improved phenolic resins for shell molds and cores eliminate caking problems of stored coating sands!

Field-test reports are coming in. Foundry men state that use of Resinox Cold Coating Resins is stepping up the efficiency of their shell molding operations.

The improved Resinox formulations, developed in Monsanto's Foundry Research Laboratory, are demonstrating outstanding free-flowing and non-dusting characteristics. Mixing time is reduced for either dump box or blowing equipment. No caking problems are encountered under normal storage conditions.

With Resinox Cold Coating Resins you can simplify your coating cycle. Conventional mixing equipment as well as specially designed mixers can be used. The resultant resin coating on each sand particle enables smaller amounts of resin to achieve the required strength properties in shell molds and cores.

Castings produced with these shells require little or no machining. Edges are clean and sharp. Intricate detail is maintained.

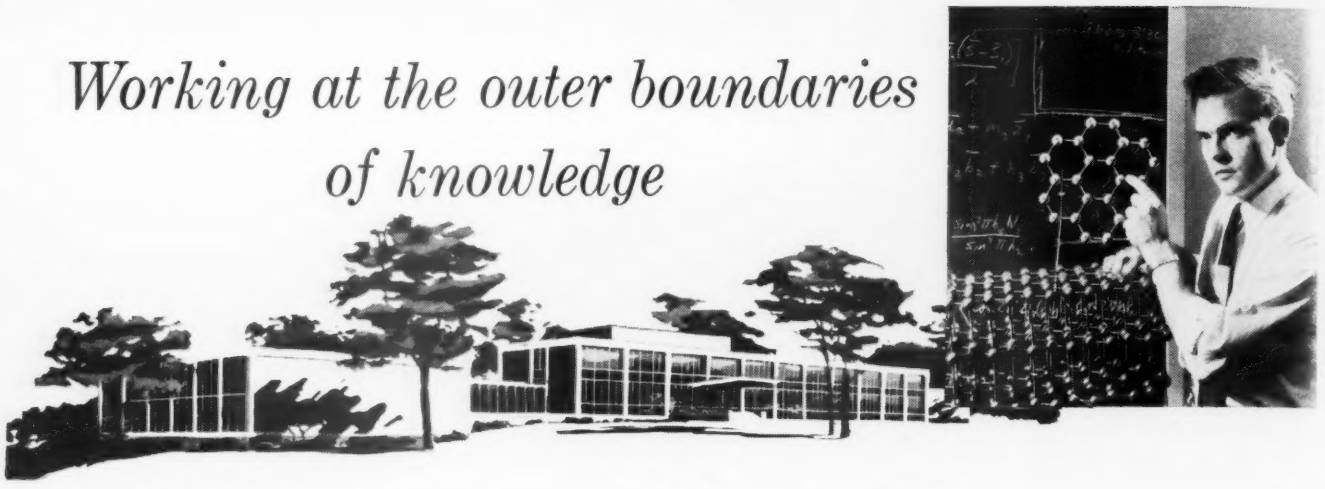
Because the economy and efficiency of shell molding depends so much on the quality of the resin used, it will pay you to get specific information on this new development. Send for data sheets and literature on new Resinox Cold Coating Resins. Write Monsanto Chemical Company, Plastics Division, Room 454, Springfield 2, Mass.

MONSANTO

*Resinox: Reg. U. S. Pat. Off.

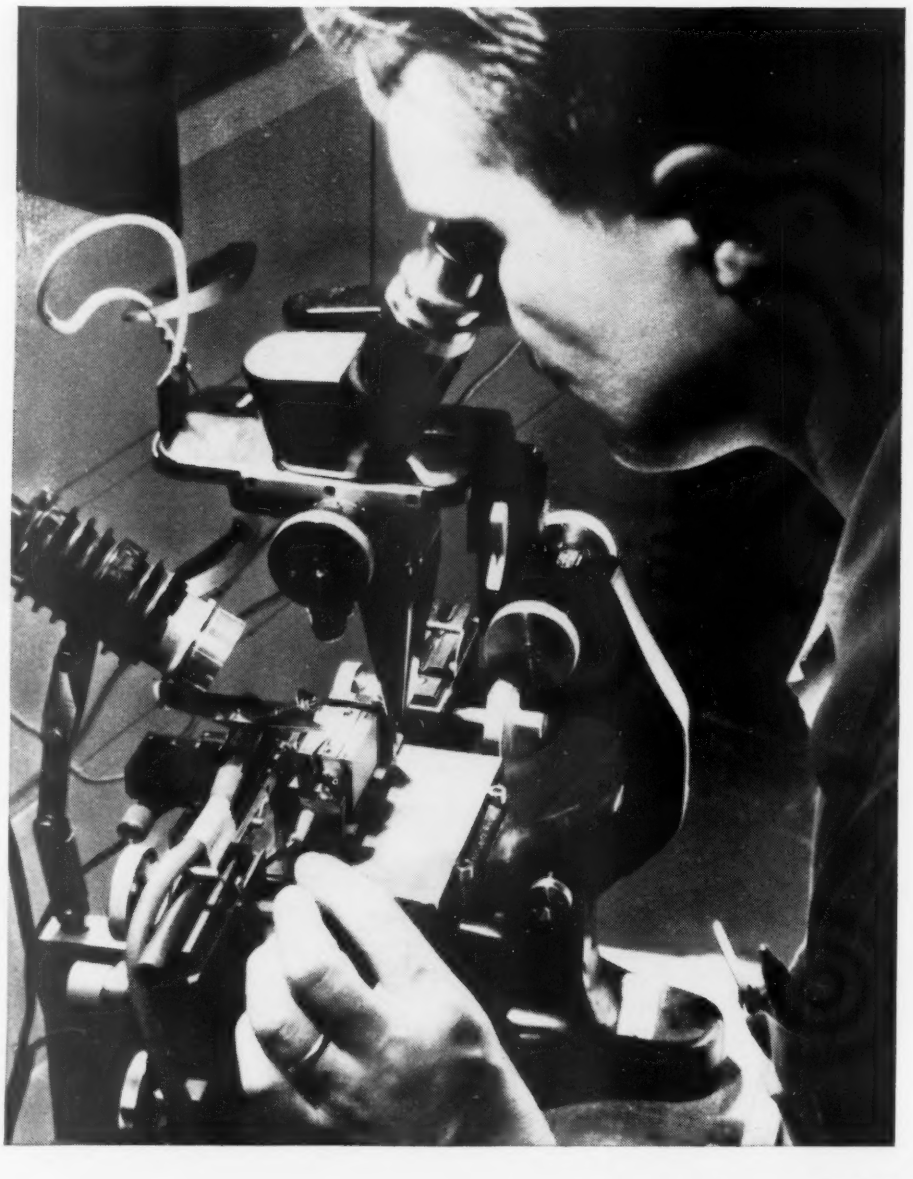
Circle 616 on Inquiry Card—Page 255

Working at the outer boundaries of knowledge

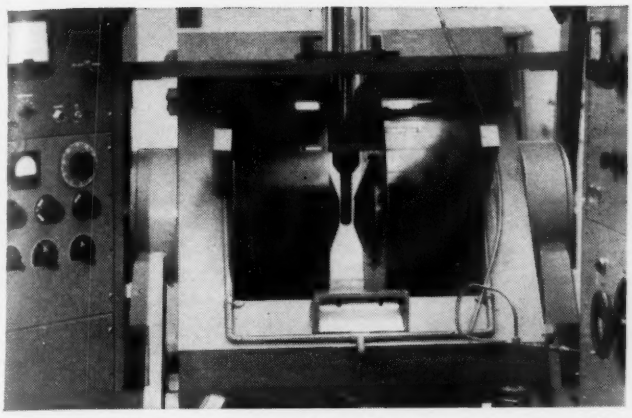


New Research Laboratories in Parma, Ohio. To expand its pioneering work in solid state and chemical physics, National Carbon Company has enlarged its staff of scientists and provided them with an ideal laboratory setup for creative work. Typical of their modern experimental equipment is an *arc radiation furnace* used for work on high-temperature refractories. It can bring light from a carbon arc into focus on a tiny pin-point area, *achieving an intensity* of several hundred million foot-candles — *approaching the intensity of light near the surface of the sun.*

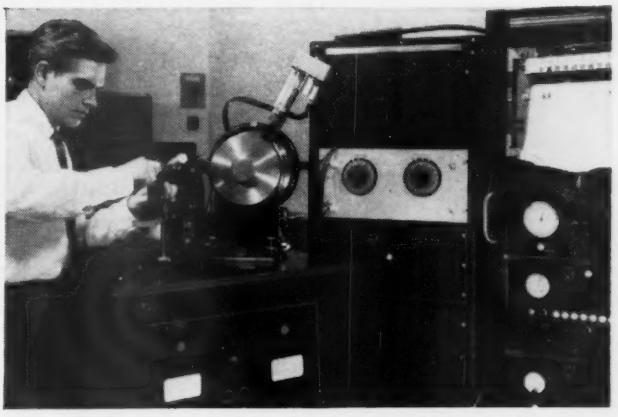
New



Mechanized tweezers handle graphite crystal. To make it into a proper experimental guinea pig, the fragile crystal must be painstakingly cut and mounted so that electrical flow can be measured along the unique crystalline directions in graphite. Experiments with pure crystals are important because all materials which we know as carbon and graphite are basically composed of the same graphite crystals being prepared here. Tremendous differences in electrical behavior and other vital properties can be traced to variations in size and arrangement of the graphite crystals in carbon products.



Graphite must pass good-conduct test. A tiny graphite crystal is chilled to within one degree of absolute zero, then held between poles of a powerful electromagnet, while electrical conductivity is measured in each crystalline direction — one of many ways to learn more about carbon.



X-ray "scatter" test reveals secrets of graphite. Testing the x-ray diffraction of carbon and graphite samples gives researchers a picture of relationships between crystals in carbon and graphite materials. This is another experimental method for probing the mysteries of carbon.

break-through in carbon physics research

promises future advances in furnace electrodes, linings, carbon brushes and other needs of the metal industries

One more barrier is down. And science strides forward in the age-old quest for deeper knowledge of carbon, one of nature's more complex puzzles.

This barrier—the inability to get large graphite crystals pure enough for experimental needs – has now been overcome by researchers of National Carbon Company. Their new annealing techniques, which remove impurities from large graphite crystals, also eliminate imperfections and weaknesses in the crystalline structure.

Several research teams at the new Parma laboratories are exploiting this break-through of science. The purified crystals are being subjected to a variety of experimental tortures—electrical, magnetic and thermal. Fundamental facts about the behavior of the single graphite crystal are being gathered and pieced together like jigsaw cutouts—building up a more complete and systematic picture. In this way, our scientists will be better able to *predict* the properties of new carbon and graphite materials.

The work on single graphite crystals is only one phase of a broad research program in carbon physics. The metals industries, as large users of carbon and graphite products, will share in the gains from this work of science at the outer boundaries of knowledge. Write for new booklet titled "Research," telling more about the work at the new Parma laboratories.

Look to **NATIONAL CARBON**
for leadership in carbon and graphite products

NATIONAL CARBON COMPANY • **A Division of Union Carbide and Carbon Corporation** UCC **30 East 42nd Street, New York 17, N. Y.**
Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto

Core Storage Doubled using ELPAR Trucks

THE PROBLEM:

Increased production plus a serious shortage of core storage space created a major problem for a prominent eastern foundry. They use a wide variety of cores and each type must be kept separated and quickly available.

THE SOLUTION:

Company engineers devised a rack handling system to be used with ELPAR high lift platform trucks. Racks 90" long were made in one, two, and three shelf units for different cores. Racks have legs to permit entrance of trucks' platform. Also, stationary supports were installed in core room to permit double tiering racks. Supports were built at 45° angle to travel aisle. ELPAR trucks are 6000 lb. gas-electric units with telescoping uprights.

BENEFITS:

Twice as many cores can now be kept in same area due to high stacking. Angle storing saves floor space and provides wider travel aisles for faster trucking. Operations are swift and fully mechanized with dependable ELPAR trucks. Trucks have special resistance units on starting circuits and brakes that are specially adjusted to insure smooth starts and stops. This holds the breakage of fragile green cores to a minimum.

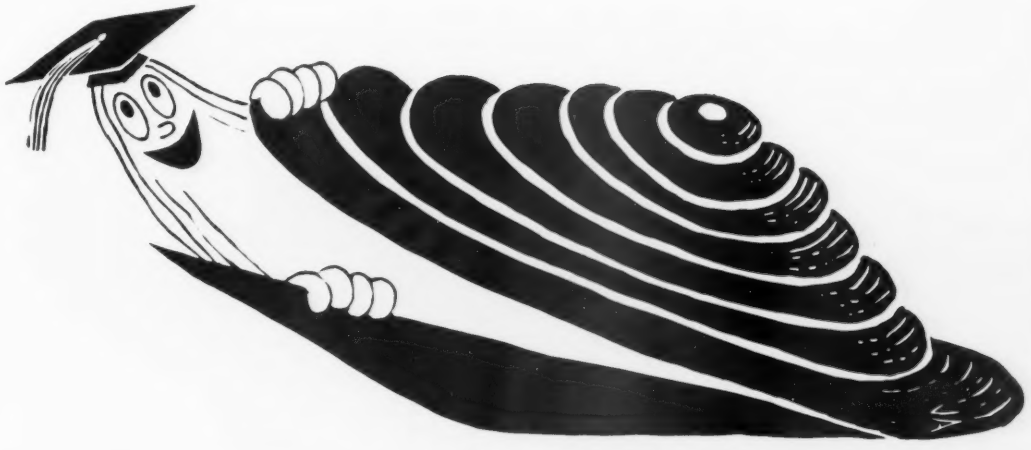
Write for Case Histories showing how ELPAR Trucks save money in foundries.

THE ELWELL-PARKER ELECTRIC CO.

4317 St. Clair Avenue • Cleveland 3, Ohio

ELPAR truck carrying complete mold set on one rack.

"Can't teach me anything about shell molding...



but wise foundries can get help from **Plenco"**

Many shell-casting success stories, in recent years, have begun with a preliminary conference between foundry and Plenco. Here, engineers combine a broad experience of shell molding problems with a specialist's knowledge in selecting (or creating) the molding compound that assures the most advantageous solution to the problem. May we consult with you on the use of Plenco-developed, quality resins in your production?

PLENCO PHENOLICS

FOR BETTER PLASTIC PRODUCTS

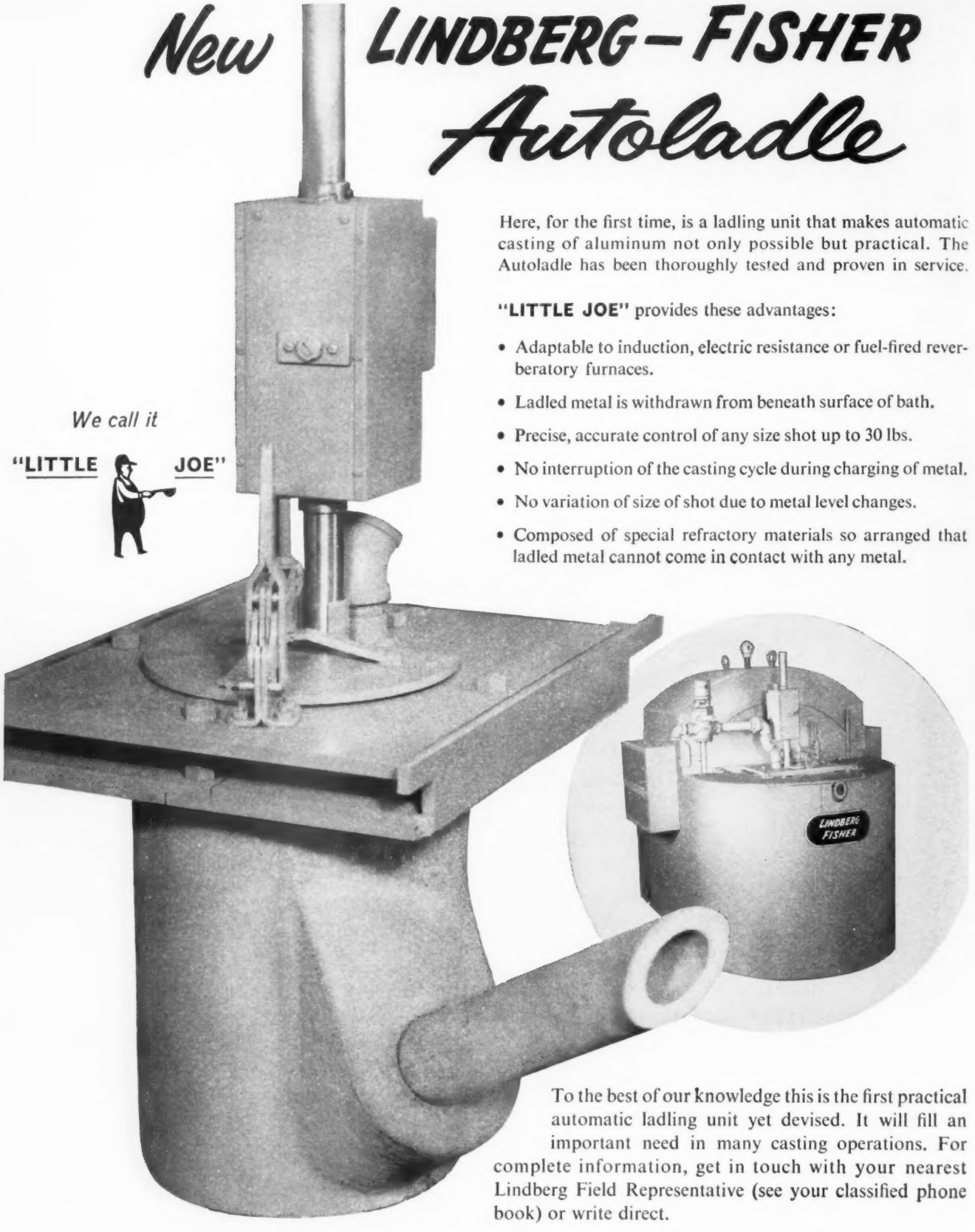
PLASTICS ENGINEERING COMPANY

Sheboygan, Wisconsin

Serving the plastics industry in the manufacture of high grade phenolic molding compounds, industrial resins and coating resins.

Circle 619 on Inquiry Card—Page 255

New LINDBERG–FISHER Autoladle



Here, for the first time, is a ladling unit that makes automatic casting of aluminum not only possible but practical. The Autoladle has been thoroughly tested and proven in service.

"LITTLE JOE" provides these advantages:

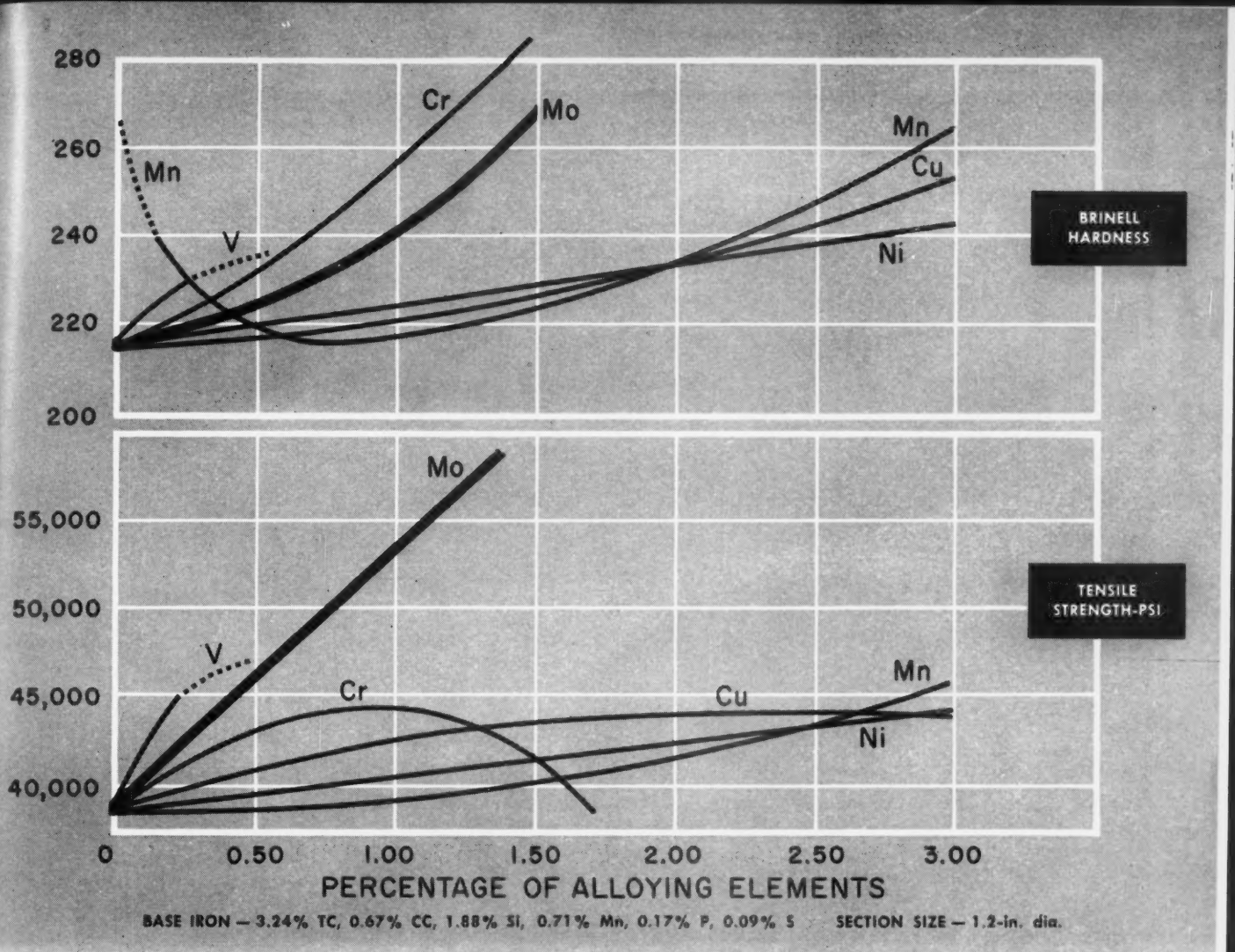
- Adaptable to induction, electric resistance or fuel-fired reverberatory furnaces.
- Ladled metal is withdrawn from beneath surface of bath.
- Precise, accurate control of any size shot up to 30 lbs.
- No interruption of the casting cycle during charging of metal.
- No variation of size of shot due to metal level changes.
- Composed of special refractory materials so arranged that ladled metal cannot come in contact with any metal.

To the best of our knowledge this is the first practical automatic ladling unit yet devised. It will fill an important need in many casting operations. For complete information, get in touch with your nearest Lindberg Field Representative (see your classified phone book) or write direct.

LINDBERG FISHER MELTING FURNACES

A Division of Lindberg Engineering Company, 2453 West Hubbard Street, Chicago 12, Illinois

Circle 620 on Inquiry Card—Page 255



Note how additions of moly, up to 1.5%, produce proportional improvements in strength. And, with moly, hardness increases much more slowly. It means higher strengths can be used with less danger of impaired machinability.

each ½% Moly adds 7000 psi to strength of cast iron...

A little moly adds a lot of strength — for molybdenum increases strength more than any other common alloying element, with the exception of small vanadium additions. A rule of thumb is that fifty points of moly raise tensile strength 7000 psi. And without sacrificing toughness. Actually, moly improves toughness at least as much as strength.

What's more, versatile moly aids in obtaining uniform response to heat treatment . . . and in producing machinable, growth-resistant castings. Moly is easy to use, too.

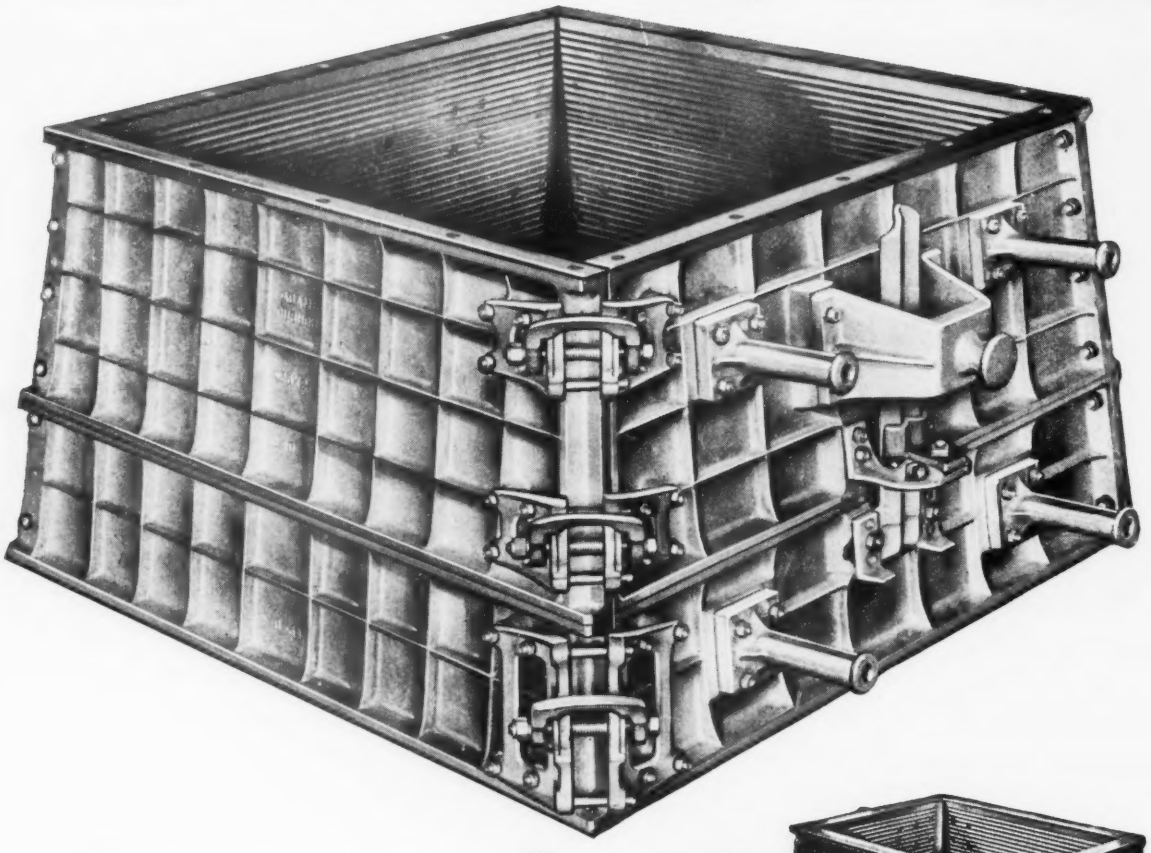
With most grades of cast iron, moly requires no change in the character of the charge, normal melting practice, or the base metal. And foundrymen like the fact that the small additions necessary may be made at the spout or in the ladle.

Write now for "Why Moly Iron". It's the full story of how and why moly adds strength faster than hardness, how it increases fatigue and torsional strength—in short why moly makes better cast iron. Climax Molybdenum Co., Department 20, New York 36, N. Y.

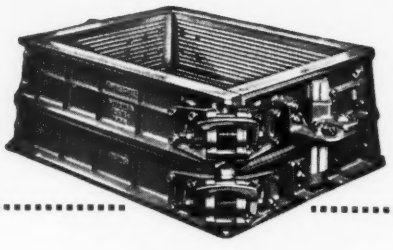
CLIMAX MOLYBDENUM

Circle 621 on Inquiry Card—Page 255

Adams Aluminum Easy Off Flasks



Large or Small



Used with ADAMS JACKETS cast iron or aluminum

Assures you another winning combination from the most complete line of quality flask equipment.

Write us today for further information. Let Adams help you analyze your flask equipment problems.

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

700 FOSTER STREET, DUBUQUE, IOWA, U.S.A.

Circle 622 on Inquiry Card—Page 255

These two 300 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio used to lag from 8 to 10 weeks behind production schedules. By installing four 300 pound TOCCO melting furnaces this firm upped daily melting capacity to 16,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 5000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push-button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs—foundry premiums directly linked to TOCCO's rapid melting, simplicity of operation, low alloy loss, constant burn off and pinpoint quality control.

THE OHIO CRANKSHAFT COMPANY

TOCCO

*Trade Mark Reg. U. S. Pat. Off.

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. F11, Cleveland 5, Ohio

Please send copy of "The Case for TOCCO Induction Melting."

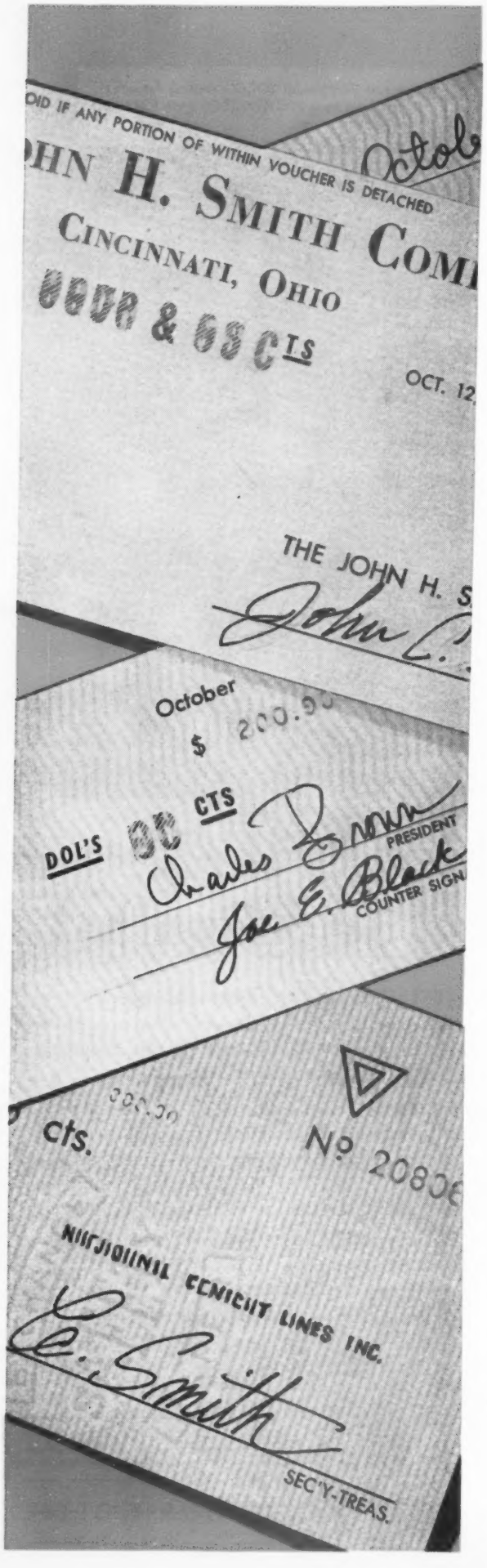
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____



How to really cut costs in your cleaning room!

Switch to

CINCINNATI PD SNAGGING WHEELS

If your cleaning room costs are cutting into your profits, switch to CINCINNATI (PD)° SNAGGING WHEELS—the greatest grinding wheel development in years! CINCINNATI (PD) WHEELS will absolutely cut your cleaning room costs . . . saving you money four important ways:

- LONGER WHEEL LIFE—Through longer life of CINCINNATI (PD) WHEELS, users have reported almost *double* the production per wheel. One customer, using a portable grinder, gets almost twice the life with a CINCINNATI (PD) Flared Cup. Another user, snagging cylinder blocks on a swing frame, has increased the production per wheel 45% with (PD) WHEELS.

- FREER CUTTING—You can get more pounds of metal per hour with the grains and bonds specified by CINCINNATI for your jobs. Operators like the fast, easy cutting action of CINCINNATI (PD) WHEELS.

- SELF-DRESSING ACTION—The CINCINNATI (PD) WHEELS specified by CINCINNATI abrasive engineers require few, if any, dressings. With the right grade wheel, new cutting grits are bared as soon as old grits get dull and inefficient.

- POSITIVE DUPLICATION (PD)—"On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet these better, cost-cutting CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

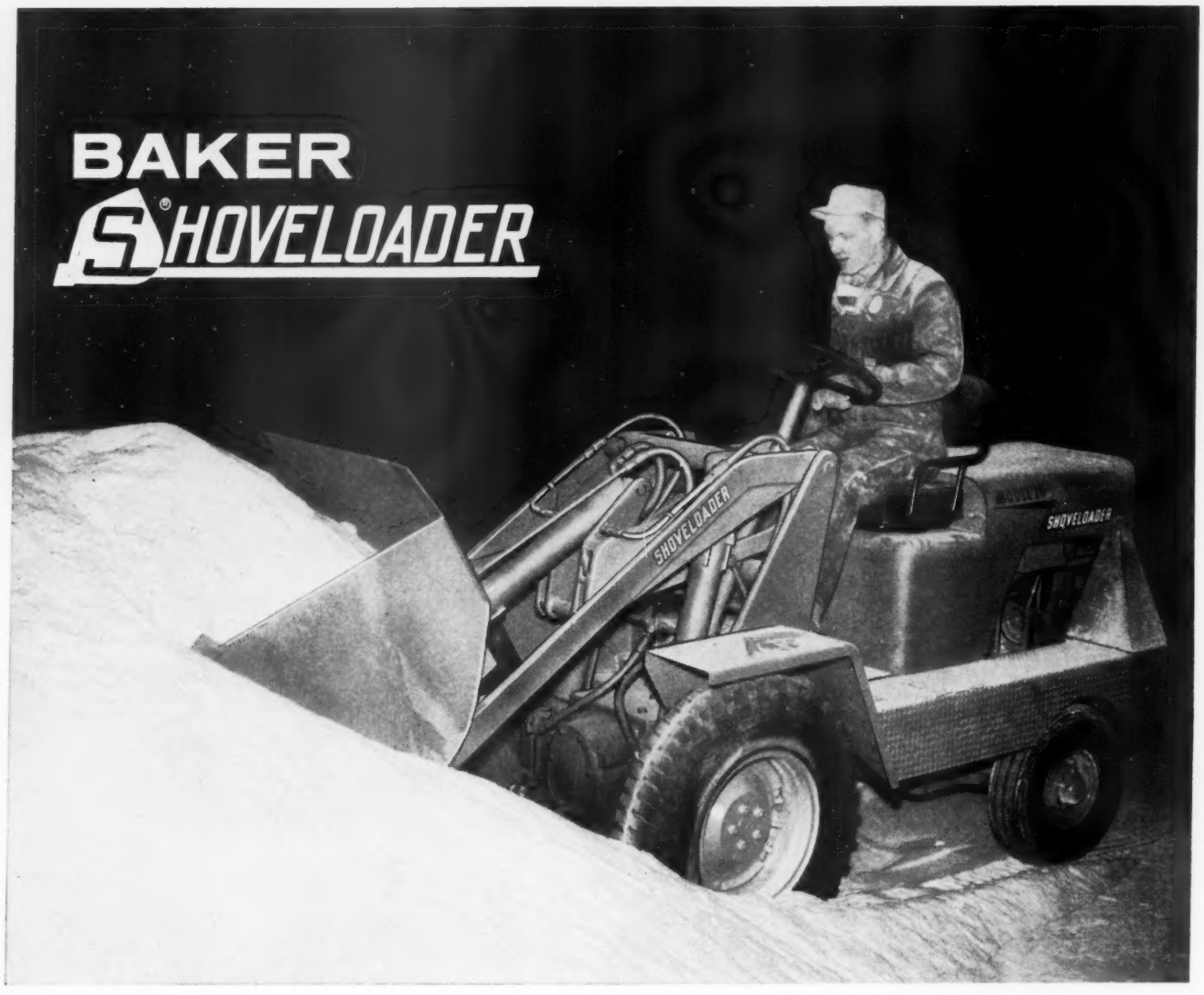
CINCINNATI (PD) WHEELS are made in vitrified and resinoid bonds for both ferrous and non-ferrous foundries and are available in a complete variety of sizes and shapes.

For full details on how CINCINNATI (PD) WHEELS can increase your production and cut your cleaning room costs, contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct and we'll send one of our representatives. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Mark Reg. U. S. Pat. Off.

CINCINNATI°
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



...mechanizes your bulk handling for less per day than the cost of a laborer with a hand shovel

Baker Shoveloader costs around $400 less than comparable machines—enables you to mechanize bulk material handling for about $10 per day—less than the pay of a laborer with a hand shovel.

Designed for continuous heavy work, Shoveloader takes a 12 cubic foot bite weighing up to 1500 pounds. Four forward speeds with top speed of 14 mph make this a fast machine and insure better operation on ramps and rough ground.

And don't forget safety when you compare. The operator is behind the lift arms and has a full 360° view at all times. He can see both bottom and end plates of the bucket when loading. Other exclusive features include "all-in-one" power train (engine, transmission, drive axle, wheels), longest forward reach, and the famous Baker hydraulic pump and cylinders for long-life dependability.

Shoveloader is versatile, too. Use it for other plant operations with any of the following accessories available at low extra cost: lift-forks, solid tires, narrow bucket, crane hook, and catalytic muffler. Write us or telephone your Baker representative for complete information.

Baker®
handling equipment

THE BAKER-RAULANG COMPANY

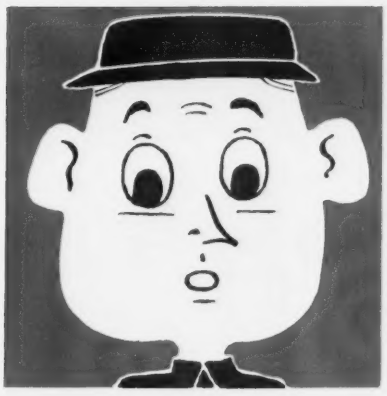
1223 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

6SB1

Circle 625 on Inquiry Card—Page 255

Circle 626 on Inquiry Card→



when You Use

Famous

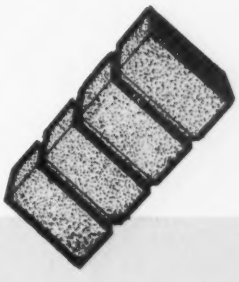
CORNELL

CUPOLA FLUX

It purges impurities in molten iron and makes it more fluid. You produce cleaner castings and cut rejects to a minimum. That's why so many foundries make it "standard operating procedure" to use Famous Cornell Cupola Flux. By constant use of this scientifically-designed mixture of high-grade fluorspar and other materials you get these advantages: increase in the amount of slag that floats and flows off, sulphur greatly reduced, cleaner castings and rejects cut to a minimum.

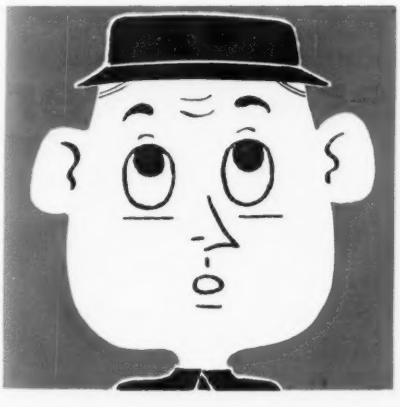
Why not call us today or send for Bulletin 46-B.

don't accept substitutes



IRON QUALITY GOES UP! ▸ ▸ ▸

▸ CUPOLA MAINTENANCE COSTS GO DOWN!



The Benefits . . . The Advantages of Famous CORNELL Aluminum and Brass Flux

Makes metal pure and clean.
Permits use of more scrap without danger of dirt, porous places or spongy spots, due to dirty metal.
Thinner, yet stronger sections can be poured.
Metal does not cling to the dross as readily.
Crucible or furnace linings are kept clean and preserved.
Cleanses molten brass (whether red or yellow) even when the dirtiest brass turnings are used.
Saves considerable tin and other metals.
Forms a perfect covering over the metal during melting, prevents oxidation and reduces obnoxious gases to a great extent.

Write for Bulletin 46-A

The **CLEVELAND FLUX** *Company*

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

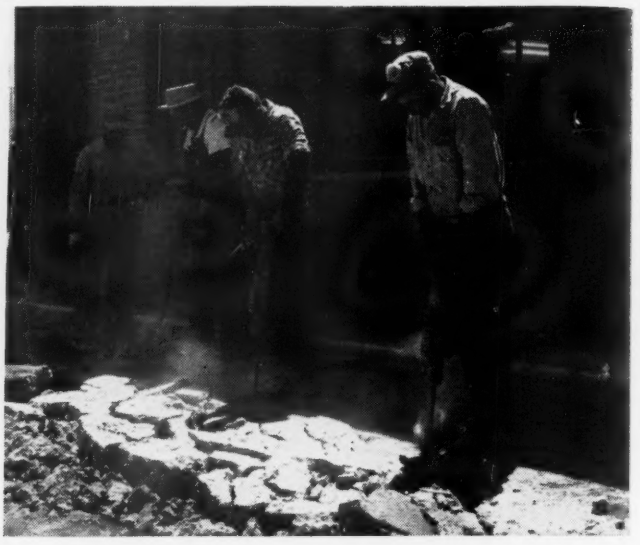
Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

Gardner-Denver . . . Serving the World's Basic Industries

DOWN SHE GOES. Powerful G-D sheeting driver gets the job done—fast.



BREAK IT UP. That's an order for this hard-hitting Gardner-Denver paving breaker.

GRINDING OUT THE WORK. It's a cinch with a husky Keller Tool air grinder.

DRILLING THE HOLE. Nothing to it with a G-D utility drill and air compressor.

You repair the job . . . not the tool when you choose Gardner-Denver

Many of the world's industries rely on Gardner-Denver air tools for plant maintenance work where time and cost are important factors.

Write for descriptive literature.

Other Gardner-Denver maintenance tools:

Tampers	Air Hoists
Trench Diggers	Impact Wrenches
Clay Spaders	Sanders and Chippers
Sump Pumps	Air Line Lubricators

GARDNER-DENVER Since 1859 KELLER TOOLS

GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Circle 627 on Inquiry Card—Page 255

Specialty
Safety Products

AO† "H"

Series Face Shields give **Top Value** for Your Protection Dollars

New H-5 Face Shield unique features simplify window interchange

New H-5 has a full crown or spark deflector, new quick-fastening studs in front, and end clips which hold window securely. Chemical splashes cannot enter between window and headgear. Excellent impact protection. Available with acetate windows (clear or green), 24-mesh screen, and fibre. All windows optically correct and extra large (18¼″ x 10″).

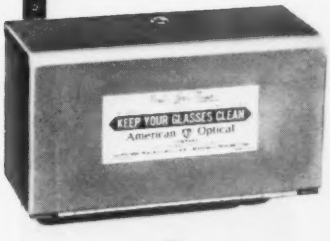
H-1. Sturdy, cool and comfortable. Adjustable elastic headband may be worn low on head for additional comfort. Standard Leather Sweatband and Window, snap-on type, are easily replaced. Acetate Windows, Clear or Green, in 3 sizes: (5″ x 11½″; 6″ x 11½″; 8″ x 11½″), and 3 thicknesses (.020″, .040″, .060″). Edge of .020″ thick window aluminum-bound.

H-2. Same as H-1 but with standard spark deflector for added protection.

H-3. Same as H-2 except that back headband is fibre, adjustable, styled to fit lower portion of head snugly. Long band slides within a fibre sleeve, permits easy adjustment, prevents hair pulling. Adjusts by knurled nut.

H-4. Has H-3 features plus full spark deflector for work in tight places where head bumps or lacerations are hazards. Deflector protects forehead and frontal scalp from flying particles. When ordering specify type of shield, size, thickness and shade of window. Refer to AO Eye Protection Catalog, S-2363, Page 54. Or ask your nearest AO Safety Products Representative.

AO 750
LENS CLEANING CABINET
Selected hardwood. Compactly provides all necessary cleansing and anti-fog materials. Attaches to walls easily. 12″ long, 9″ high, 6″ deep.



AO 850 DISPENSER
Dispenses Magic Lens Tissues treated with silicones. Tissues are extra large, 5″ x 6¾″. Best way to clean safety goggles. Each wiping lasts longer, cleaning is faster, easier. Dispenser is 3¼″ x 7¼″ x 3⅝″. Dispenses only one sheet at a time. No moving parts. Lock prevents pilferage. Easily mounted anywhere.

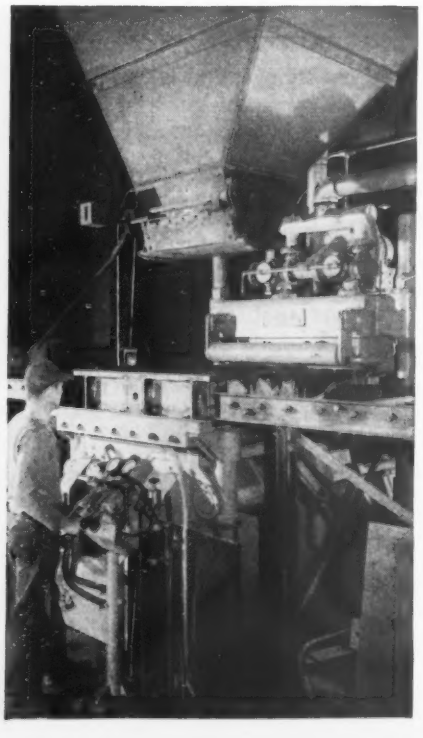
American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

Minerals International Chemicals

10 IMPROVEMENTS

1957 TACCONE DIAFORM MOLDING MACHINES



1 OUTBOARD STRIPPING PINS—With outboard pins, you have maximum versatility of flask size, with simple modification to bar-lift or roller-rail lift and a clean working surface at all times.

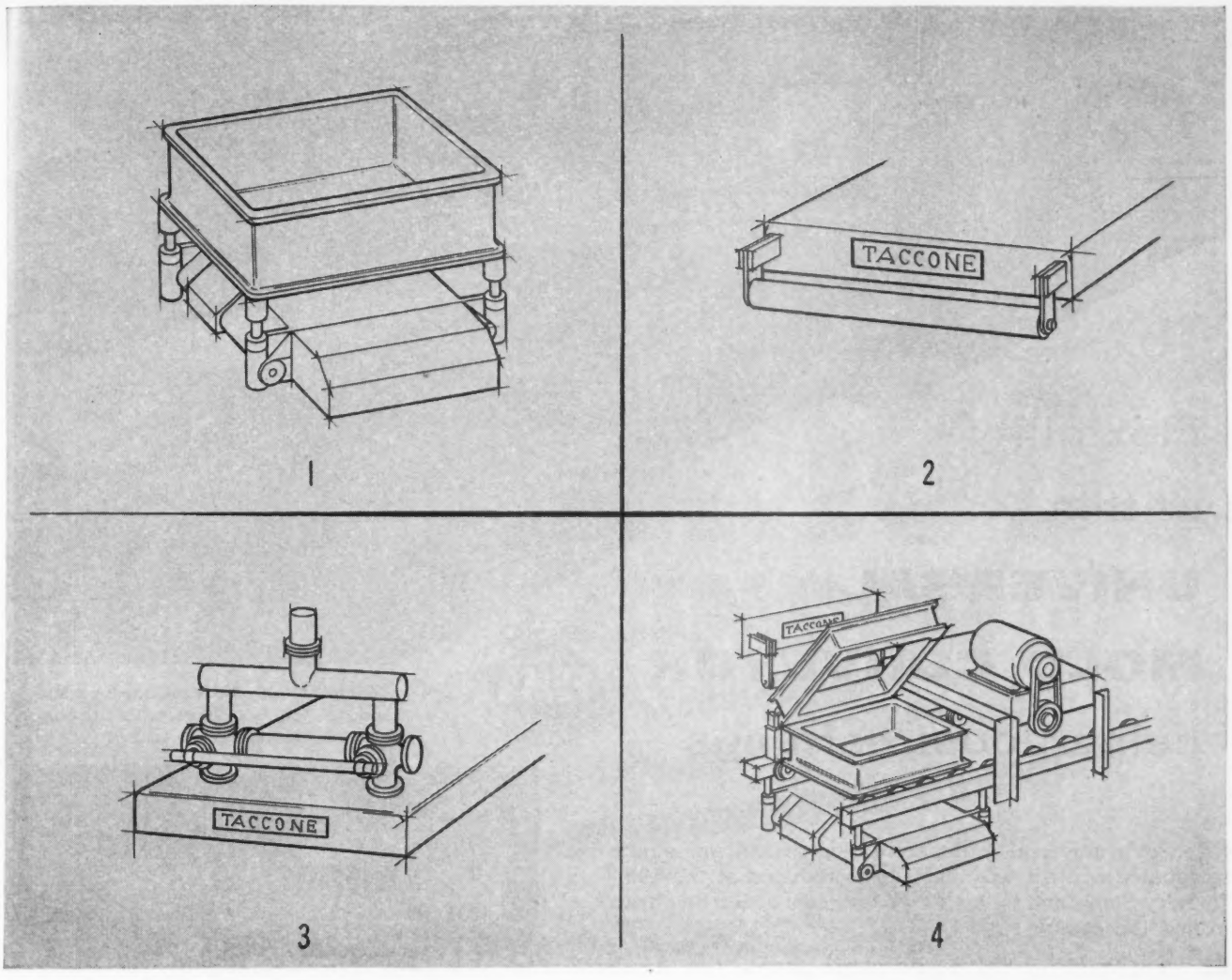
2 PREPACK ROLLER—Spill sand virtually eliminated automatically without danger of ram-offs.

3 DOUBLE INJECTION VALVE AND HIGHER POWER SUCTION—Faster air flow in and out of diaphragm head for maximum speed.

4 UPSET STRIKE-OFF—With this auxiliary equipment you can use shallower, more flexible tight flasks or removable flasks.

5 OUTBOARD OIL CUSHION—Better shock-absorption of traverse car movement cuts molding cycle to the bone.

6 ENCLOSED GEAR BOX IN OIL BATH—Entire strip mechanism working in a sealed bath of oil assures accurate stripping with minimum maintenance.

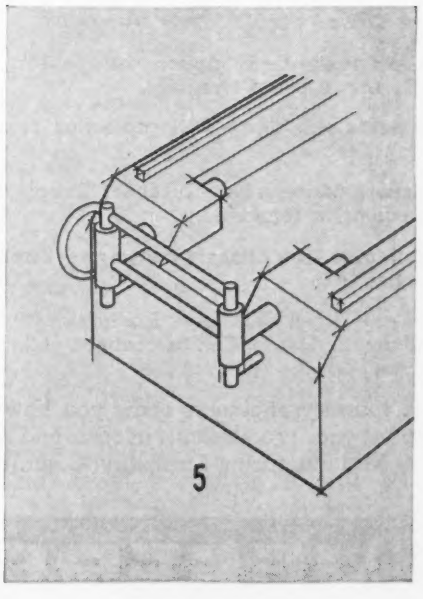


7 DRAWER TYPE MASKING FRAME—You can change flask size quickly for short run and jobbing operations by simple positioning of a metal mask.

8 QUICK-CHANGE TANK—You can now carry a spare diaphragm "loaded and ready" for fast replacement and minimum down time.

9 ELECTRICAL CONTACTS AND AUTOMATION—All models now available with full automation, semi-automation or electrified manual operation permitting a completed molding cycle in as little as seven seconds.

10 FLASK FILLING AND INDEXING EQUIPMENT—For maximum speed, all models are available with built-in automatic flask filling and indexing equipment.



Write for the Taccone Diaform Molding Machine GREEN BOOK

EASTERN CLAY PRODUCTS DEPT. • INTERNATIONAL MINERALS & CHEMICAL CORPORATION • 20 NORTH WACKER DRIVE • CHICAGO 6

Dixie Bond • Black Hills Bentonite • Revivo Bond • Plasti-Bond • Revivo Core Paste • Cupolinor • Cupoline • Taccone Molding Machines

Flexibility of this **UNIVERSAL MOLD CONVEYOR** helps boost earnings

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Molds move on the level, up, down and around. Jeffrey's Universal Mold Conveyor is flexible!

• Jeffrey's universal mold conveyor earned immediate acceptance when it was officially introduced at the 1954 Foundry Show, and today it's working in a dozen foundries around the country.

Note these advantages:

Flexible contour – Operates in both vertical and horizontal plane. Full operation at elevations to suit each operation.

No sliding wheels on curves – Wheels always radial to curves.

Smooth operation – Each car has individual adjustment to match Crawl Drive.

No lubrication needed – Equipped with sealed-for-life Ball Bearings, Oil Impregnated Bushings.

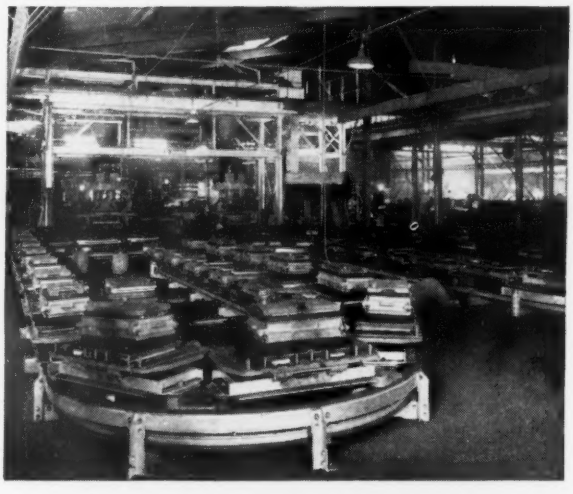
All moving parts shielded – Full protection from sand, shot and runout.

No sliding track for takeup – Internal Takeup on each car eliminates expensive foundations.

Rugged malleable iron chassis castings – Strength to spare for the toughest jobs.

Any type tops – Steel, Cast Iron, Roller Conveyor or Hinged Tops for Automatic Dump. Can be changed without interfering with conveyor.

Let Jeffrey foundry engineers show you how this system will help speed your production, cut costs and maintenance. The Jeffrey Manufacturing Company, Columbus 16, Ohio.



In service in a prominent iron foundry.

And in another modern foundry.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

GET FASTER BAKE AT LOWER TEMPERATURES with

COREX 100

CORE BINDER

Specially Processed Modified Urea Formaldehyde Liquid Resin

Thanks to a special processing treatment, cores bonded with Corex 100 bake faster (*up to 50% faster than oil bonded cores*) and at *much lower temperatures* than conventionally bonded cores. This saves you time and fuel, facilitates handling and setting in molds much faster.

Corex 100 yields sand castings with *extremely smooth finish* and *without expensive sand* or *additives*. In most cases, wash is not required. Corex 100 yields cores with high tensile strength, excellent collapsibility and easy workability in green state. It can be used in *core work of any size* for bronze, brass, gray iron, aluminum, magnesium, malleable iron and their alloys.

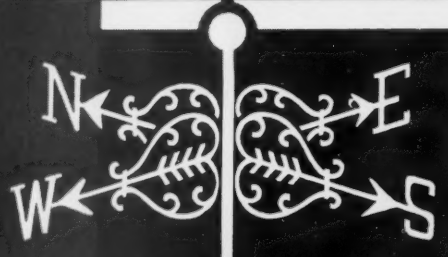
CALL or WRITE TODAY for a trial in your plant under your conditions! We will gladly send one of our foundry engineers to work with you.

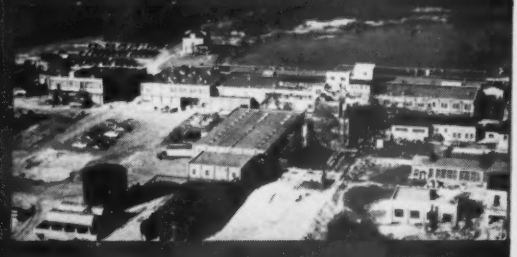
JERSEY STATE CHEMICAL CO.

59 LEE AVENUE HALEDON, N. J.

CATALIN

UREA AND PHENOLIC Shell and Core Binders





FORDS, NEW JERSEY

CALUMET CITY, ILLINOIS

THOMASVILLE, NORTH CAROLINA

FAST DELIVERIES!

From three strategically located plants... Catalin Service *Speeds* Quality—in Quantity!

Catalin, pioneer producer of an extensive range of urea, phenolic, cresylic, resorcinol, melamine and styrene formulations . . . is proud of its product reputation, and prompt service from all three of its modern processing plants: these as pictured hereon are most desirably located in the East, Midwest and South.

For the foundry industry, Catalin produces a group of fast curing, Urea and Phenolic Resins (liquid and powder) as binders for shell molds and sand cores. Serving both ferrous and nonferrous metal castings, these thermosetting formulations are developed to meet specific foundry requirements.

Catalin field representatives, experienced in the problems of the foundry industry, welcome the opportunity to discuss the superior advantages of Catalin Foundry Resins. Inquiries invited!

Catalin

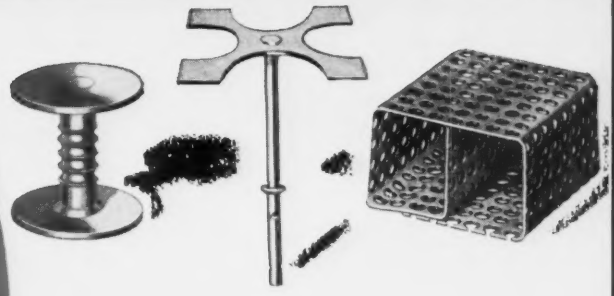
CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE, NEW YORK, N. Y.

branch offices:
CHICAGO, ILL., 221 No. LaSalle Street
GREENSBORO, N. C., 630 Southeastern Bldg.

Team Mates

for QUALITY
and SERVICE

fine FANNER CHAPLETS and CHILLS



fine FANNER NETWORK OF *Representatives*

All fine FANNER chaplets and chills are precision engineered and manufactured to tolerances of ± .002. Their many exclusive features of design, their accuracy of construction, their special metal formulas help tremendously in the production of better castings . . . at lower costs . . . with fewer losses — and they cost no more! In the great range of fine FANNER chaplets and chills will be the exact product to fit your needs.

Write for our Chaplet and Chill Catalogs — they are the authority in the industry.

To assure customers quick, dependable, efficient service a network of fine FANNER representatives has been built up across the United States. Following are listed the many organizations serving the foundry field, now handling fine FANNER products. Call on them for any of your regular or emergency needs — they are as close to you as your telephone and can help you.

These fine FANNER REPRESENTATIVES are eager to be of service!

ALABAMA
Foundry Service Co.
2321 29th Avenue, N.
Birmingham, Ala.

Hill & Griffith Co.
P. O. Box 548
Birmingham 1, Alabama

CALIFORNIA
Barker Foundry Supply Co.
4887 Fruitland Ave.
Los Angeles 58, California

Grant & Co.
2144 East 7th
Los Angeles, California

Independent Fdry. Supply Co.
6463 E. Canning Street
Los Angeles 22, California

Pacific Graphite Co., Inc.
2522 Malt Avenue
Los Angeles, California

Snyder Foundry Supply Co.
2444 E. 57th Street
Los Angeles 58, California

Pacific Graphite Co., Inc.
40th and Linden Streets
Oakland, California

Snow & Galgiani
533 Second Street
San Francisco, California

Federal Foundry Supply Co.
Box 25, Vernon Station
Los Angeles 58, California

COLORADO
Federal Foundry Supply Co.
1523 18th Street
Denver, Colorado

Mine & Smelter Supply Co.
1422 17th Street
Denver, Colorado

ILLINOIS
Hill & Griffith Co.
4606 W. 16th Street
Chicago 50, Illinois

Federal Foundry Supply Co.
3536 S. Morgan Street
Chicago 9, Illinois

The S. Obermayer Co.
2564 West 18th Street
Chicago 8, Illinois

INDIANA
The John M. Glass Co.
18 S. New Jersey
Indianapolis, Indiana

Frederic B. Stevens, Inc.
36 Shelby
Indianapolis, Indiana

KANSAS
Canfield Fdry. Sup. & Equip. Co.
1721 Minnesota Ave.
Kansas City, Kansas

MASSACHUSETTS
Cutterwood & Sanderson Co.
222 Third Street
Cambridge 42, Massachusetts

Springfield Facing Co.
Williamansett, Mass.

MICHIGAN
A. T. Wagner Co.
2720 Wight
Detroit, Michigan

Frederic B. Stevens, Inc.
1800 Eighteenth
Detroit 16, Michigan

Wolverine Fdry. Supply Co.
3211 Belleview Avenue
Detroit, Michigan

E. J. Woodison Co.
7415 S. Aubin
Detroit, Michigan

MINNESOTA
Federal Foundry Supply Co.
1150 S. Old Shakopee Road
Minneapolis 20, Minnesota

MISSOURI
M. A. Bell Co.
217 Lombard Street
St. Louis 2, Missouri

St. Louis Coke & Fdry. Supply Co.
1525 Sublette Avenue
St. Louis 10, Missouri

NEW JERSEY
Springfield Facing Co.
S. Second & Bergen Street
Harrison, New Jersey

NEW YORK
The E. J. Woodison Co.
146 Chandler
Buffalo, New York

Whitehead Bros. Co.
324 W 23rd Street
New York 11, New York

Frederic B. Stevens, Inc
93 Stone Street
Buffalo 12, New York

M. L. Doelman
66 Russell Avenue
Buffalo, New York

Lovejoy Patent Spec. Co.
Hoosick Falls, New York

OHIO
Buckeye Products Co.
7020 Vine Street
Cincinnati, Ohio

Goehringer Fdry. Supply Co.
919 West Fifth
Cincinnati 3, Ohio

Hill & Griffith Co.
1262 State Avenue
Cincinnati, Ohio

OHIO—Cont'd
Federal Foundry Supply Co.
4600 East 71st Street
Cleveland 5, Ohio

Galion Fdry. Specialties Co.
131 W. Walnut Street
Galion, Ohio

Fenton Foundry Supply Co.
134 Gilbert Avenue
Dayton, Ohio

The S. Obermayer Co.
647 Evans Street
Cincinnati 4, Ohio

Hoffman Fdry. Supply Co.
1193 Main Avenue
Cleveland, Ohio

Freeman Supply Co.
1152 East Broadway
Toledo, Ohio

OREGON
LeGrand Indust. Supply Co.
155 W. Arthur
Portland, Oregon

PENNSYLVANIA
J. S. McCormick Co.
25th Street & A. V. R. R.
Pittsburgh 22, Pennsylvania

The S. Obermayer Co.
33rd & A. V. R. R.
Pittsburgh 1, Pennsylvania

William E. Hoffman and Son
3404 Circle Avenue
Reading, Pennsylvania

S. G. Walton
80 26th Street
Pittsburgh 22, Pennsylvania

J. J. McCoy
5232 Hutchinson
Philadelphia, Pennsylvania

RHODE ISLAND
Whitehead Bros. Co.
17 Exchange Place
Providence, Rhode Island

TENNESSEE
Foundries Supply Co.
2762 Tanglewood Road
Chattanooga 5, Tennessee

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3010 West 18th Street
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M. A. Bell Co.
3201 Sherman
Houston, Texas

Hill & Griffith Co.
1302 Nance Street
Houston 10, Texas

VIRGINIA
Federal Foundry Supply Co.
1717 Summit Avenue
Richmond 21, Virginia

WASHINGTON
Pearson & Smith
W. 1133 College Avenue
Spokane, Washington

Carl F. Miller & Co.
1217 6th Avenue, S.
Seattle, Washington

Wan Waters & Rogers Co.
4000 1st Avenue, S.
Seattle, Washington

WISCONSIN
Fire Brick Engineers Co.
2400 South 43rd Street
Milwaukee 1, Wisconsin

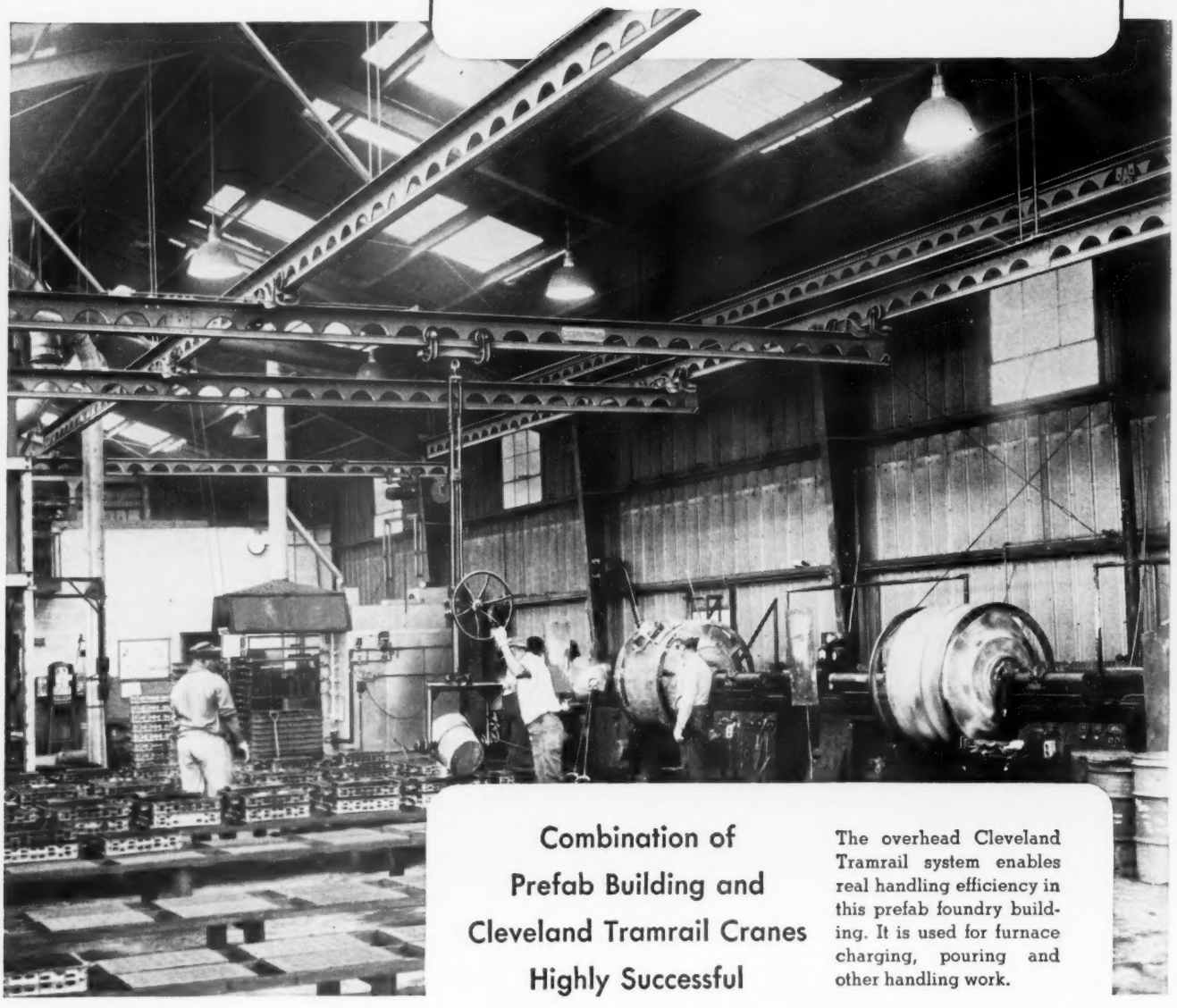
Foremost Foundry Supply Co.
2400 S. 43rd Street
Milwaukee, Wisc.

THE FANNER MANUFACTURING COMPANY

designers and manufacturers of FINE FANNER CHAPLETS AND CHILLS

BROOKSIDE PARK **CLEVELAND 9, OHIO**

Here's an idea for a **LOW COST EFFICIENT FOUNDRY**



Combination of Prefab Building and Cleveland Tramrail Cranes Highly Successful

The overhead Cleveland Tramrail system enables real handling efficiency in this prefab foundry building. It is used for furnace charging, pouring and other handling work.

THE foundry of Western Automatic Machine Screw Co., Elyria, Ohio, offers a real idea for saving money to anyone contemplating expanding or building a new foundry.

Two prefabricated metal buildings, each 50' x 160', joined side by side, are used for the structure. Although the building trusses will support concentrated loads of 6000 lbs. at the middle of the span, the Cleveland Tramrail cranes are of one ton capacity and operate on three runways. There also is Tramrail trackage over the 750 lb. gray iron electric furnaces on which motorized carriers handle buckets of charge materials.

This foundry has proven very successful, both from standpoints of original cost and production efficiency. Cleveland Tramrail's "know-how" in equipping prefab buildings with materials handling equipment has proven of great help in achieving these ends. Of importance, too, is Cleveland Tramrail's method of flexible track suspension which minimizes load concentrations and provides better distribution of stresses.

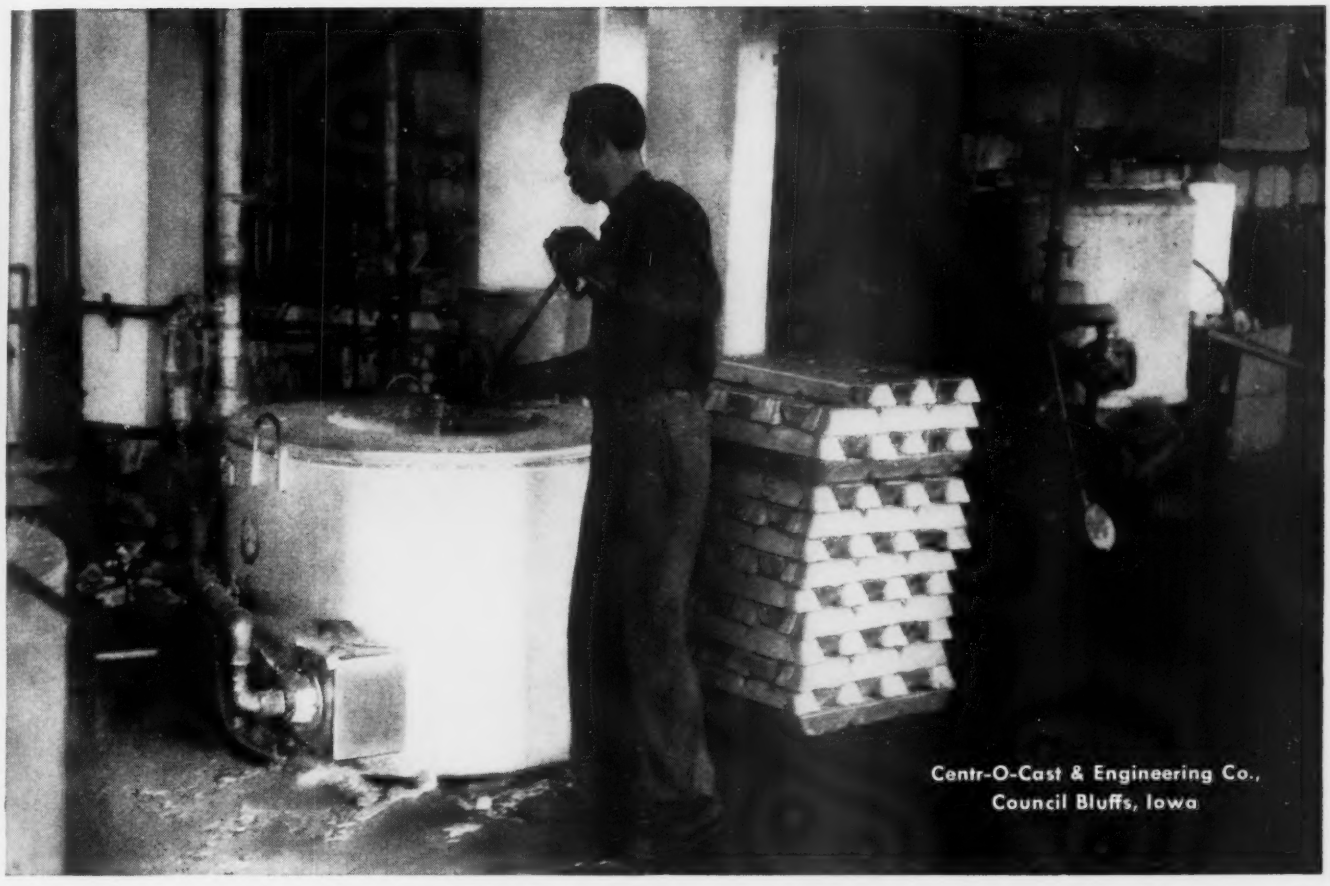
Western Automatic's foundry, including concrete work, sewer, plumbing, lighting and the Cleveland Tramrail equipment cost far less than for a conventional building, yet it produces efficiently.

As a leader in foundry materials handling equipment, look to Cleveland Tramrail for cost-saving ideas.

FREE BOOKLET: *If you have a prefab or are considering erecting one, this illustrated booklet will be helpful.*
Write for No. 2020A

CLEVELAND TRAMRAIL
Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3840 E. 286 ST. • WICKLIFFE, OHIO



Centr-O-Cast & Engineering Co.,
Council Bluffs, Iowa

"Cities Service Heat Prover Showed Why Holding Pots Burned Out Prematurely!"

Put yourself in the place of Centr-O-Cast & Engineering Company.

You make permanent mold and centrifugal aluminum castings from 2 ounces to 65 pounds . . . and your products are so wanted that you've increased your business 50-fold since you began 10 years ago.

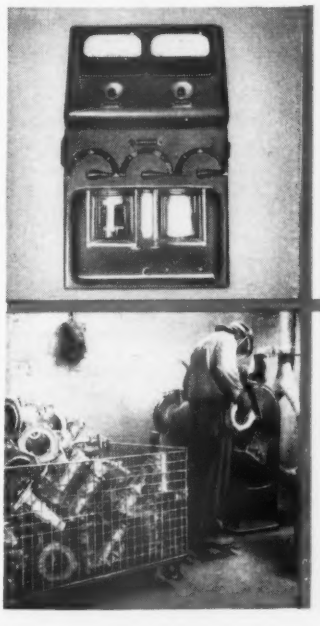
To meet this demand, you're now operating at a melting capacity of 1,500,000 pounds of aluminum per month, using 20 holding furnaces, two 500# melting furnaces, and two 800# melting furnaces.

Then suddenly—TROUBLE! One after another, holding pots start burning out prematurely . . . and you've got to find the reason and the solution *fast*.

How? Centr-O-Cast solved the problem by calling in their local Cities Service Lubrication Engineer—the man with the ingenious little troubleshooter known as the Cities Service Heat Prover.

Enabling simultaneous readings of oxygen and combustibles, the portable Heat Prover quickly determined excessive heat as the cause of the burnout and revealed what combustion adjustments were necessary. "Since then, there's never been a premature burnout due to improper combustion," says partner L. W. Wickson. "What's more—Cities Service has supplied this service free!"

Nothing can be added to Mr. Wickson's statement except an invitation to you to try the Cities Service Heat Prover in solving your combustion problems. Talk with your Cities Service Lubrication Engineer or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



It Turned the Heat on a Burning Problem. The Cities Service Heat Prover was used by a Cities Service Lubrication Engineer to solve a costly problem of preliminary burnout in holding furnaces. Heat Prover showed cause and enabled necessary combustion adjustments.

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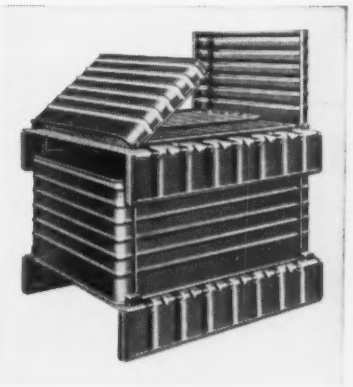

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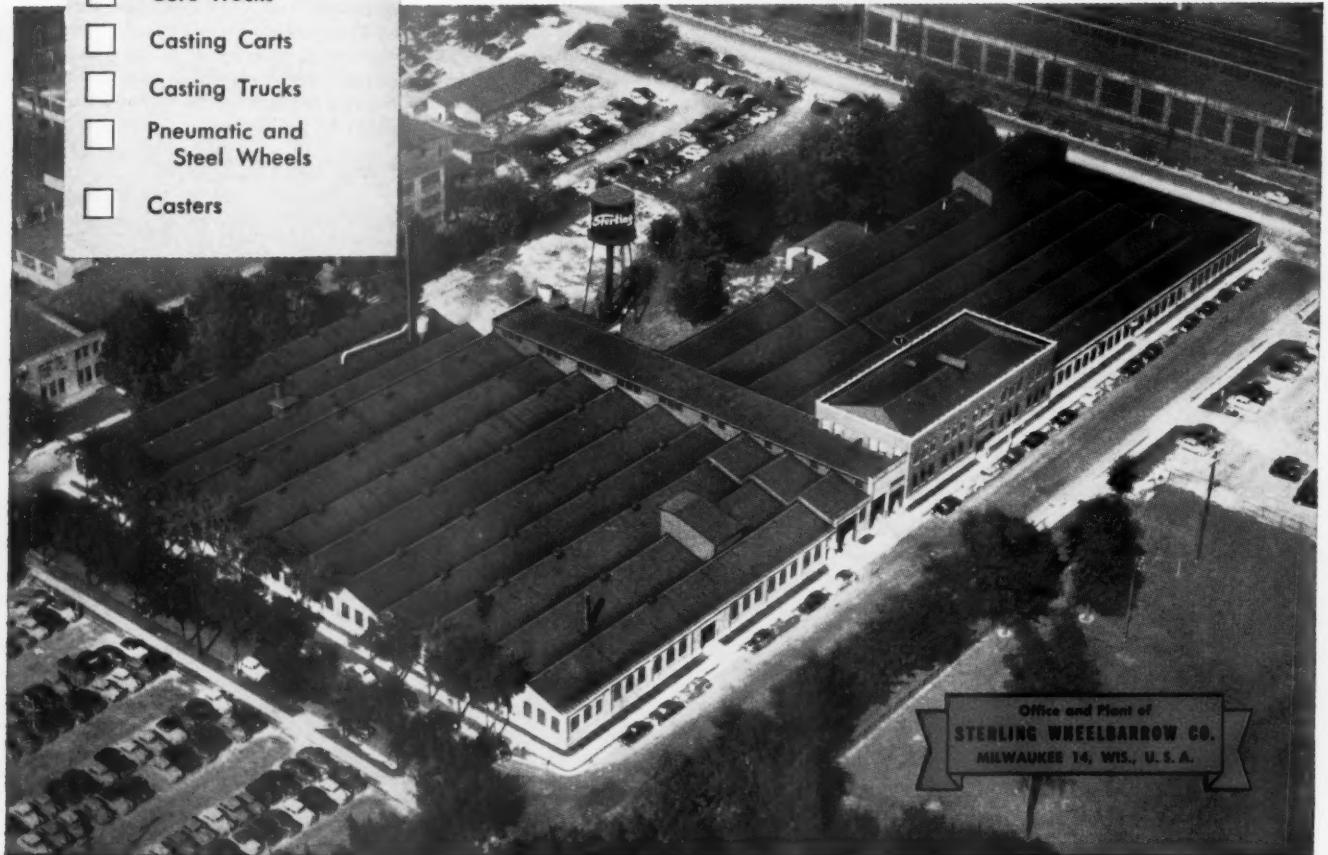

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Every Foundry Benefits

In the nine years since the Foundry Educational Foundation was organized, it has contributed greatly to the training of a growing number of engineers for the foundry industry. The outstanding plan of the foundation and the splendid support of many leading foundrymen has made a tremendous impact upon engineering colleges and universities.

Today 16 important institutions of higher learning, stretching from coast to coast, are participating directly in the FEF program, and numerous others have been influenced by the soundness of foundation activities. Many more foundry courses now are offered than in the past, and the number of men engaged in teaching foundry theory and practice has grown remarkably. Most foundry laboratories in FEF schools have been modernized and, to a degree, mechanized.

Scholarships, improved courses, better laboratories and the enthusiasm of the faculty have combined to interest many boys in studying foundry. As a result, the number of young engineers entering the foundry industry continues to increase. In the years ahead, these men, and the many others to follow, will provide the technical and operating management that will complete the job of changing castings production from an art to an engineering science. Progress in the foundry industry depends greatly on the results of this phase of the FEF program.

But benefits of perhaps greater significance than the training of engineers for the foundries are being provided by FEF. Organization of the foundation and the raising of money to carry on its program attracted attention in academic circles beyond the instructional corps of foundry departments. Faculty members teaching materials, design and related subjects were impressed by this progressive industry with a plan and the enthusiasm to carry it through.

These professors took a new look at castings and at the data and materials that had been supplied them for a number of years by trade and technical associations. They found that many changes had been made in castings, which now provide an entirely new field of engineering materials. So they told their students about castings, what they are, how they are used and where they can be used.

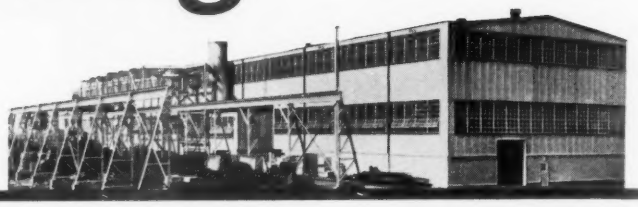
This is a wonderful sales promotion effort from which every foundry in the country benefits.

The FEF has done an outstanding job for the foundry industry, but a greater job can be done if more funds are available. Since every foundry in the country benefits from some phase of the program, every foundry should support the foundation through membership.

Frank G. Steinbach
Editor

Cement Molding

at Chambersburg



Ten years of advance planning went into new $1 million foundry that uses cement-bonded sand to produce large gray, special alloy and ductile iron castings that vary in size from 1 to 150,000 lb

By KENNETH L. MOUNTAIN
Associate Editor

FAITH in the future and confidence in its ability to produce high-quality, large gray, alloy and ductile iron castings in cement-bonded sand are returning big dividends to the Chambersburg Engineering Co., Chambersburg, Pa.

Founded in 1897, the company was originally located in the plant of the old Taylor Engine Co. The property included a small foundry. In 1902, a large-capacity foundry was built and until 1932 it supplied castings exclusively for use on the world-famous Chambersburg forging hammers, presses and allied equipment. Two developments followed shortly that have had an important bearing on the company's growth—a special alloy was developed and sales of castings to outside customers was started.

In 1936, the cement-bonded sand method of casting was adopted and has been used since. In 1948, a series of ductile iron alloys was introduced, and in that year Chambersburg Engineering Co. became one of the first commercial foundries producing large ductile iron castings. The aim of the special alloys for use in anvils and hammer frames is to combine the mass and vibration resisting properties of gray iron with strength and wear resisting properties.

New Foundry Provided—Ten years of planning was culminated early this year when the first metal was poured in a new $1 million foundry. This new plant incorporates mechanical handling equipment and provides efficient space utilization and material flow to assure maximum flexibility. Each operation was analyzed carefully to determine the degree of mechanization which could be used economically without sacrificing versatility and quality.

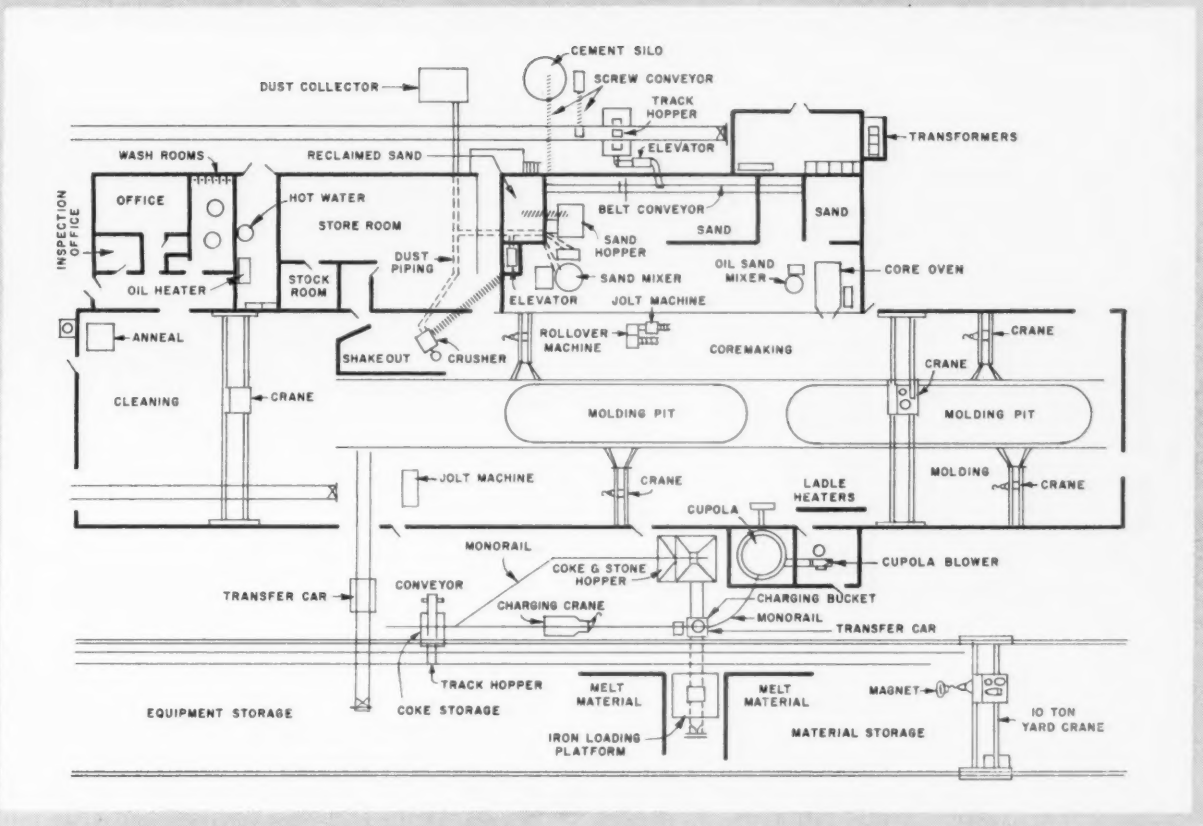
So smooth and well planned was the changeover from the old foundry to the new one that metal was poured in the old operation on Wednesday, Jan. 11, and production started on Monday, Jan. 16 in the new plant. The old foundry building has since been dismantled.

The 80 x 400 ft building is constructed of cement block and corrugated asbestos sheeting. An abundant supply of natural light is admitted through two rows of windows which encircle the structure. Roof material is poured gypsum, which is fireproof in addition to having good insulation qualities.

Castings produced vary in size from 1 to 150,000 lb. An estimated 80 per cent of the tonnage is in castings 10,000 lb and larger. Seven hundred active jobbing patterns and 7000 Chambersburg patterns are stored. Pump, centrifugal blower and turbine cases, condenser shells, planer tables, boring mill uprights, hydraulic rams, hydraulic press platens, housings and platens and large engine blocks are indicative of the types of work done in addition to the variety of components made for its own lines of equipment.

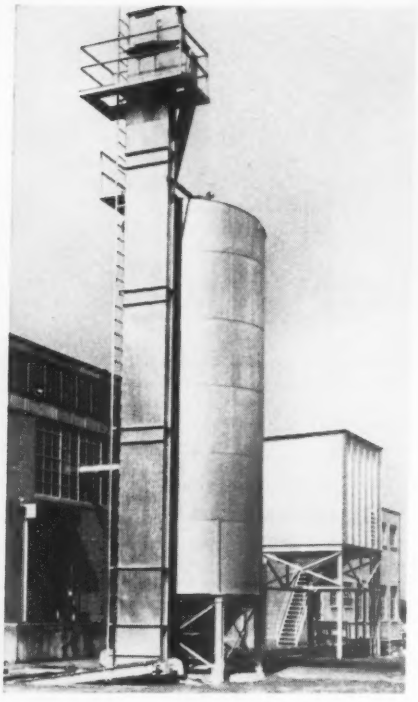
Preliminary planning indicated that about 70 per cent of the castings produced would be for Chambersburg's own use. The remainder would be sold to selected customers. A market area encompassing a radius of several hundred miles from the foundry was prescribed when the foundry was in its blueprint stage. Since the foundry started operations, demand for its production has expanded, resulting in an ever-increasing percentage of the total tonnage being cast for outside customers. The market area now extends beyond the original estimate.

Cement Molding Advantages—Buyers of heavy castings have found that cement molding offers several advantages. Large castings can be produced to close tolerances with minimum shrinkage problems. Mold accuracy and strength of the sand give good surface finish and permit practically all types of pit molding. Cement-bonded sand resists distortion under metal pressuring during pouring and solidification. Because there is a minimum of combustible material in the mixture, practically



Floor plan layout shows relationship of various departments with each other

The new foundry incorporates mechanical handling equipment and provides efficient space utilization and material flow to assure maximum flexibility



Used molding sand and cement is reclaimed following shakeout by feeding through a hammer mill crusher to break down bond

Incoming cement is stored in 600-bbl-capacity silo outside the foundry. Note the dust collection equipment in the background

no gas is generated. Little or no reinforcement in the form of rods and arbors is required. No heat is required to dry the molds.

A washed 50-mesh New Jersey silica sand is delivered in hopper cars and dropped through a grating onto a conveyor belt and fed to an outside enclosed elevator for transfer to a 55-ft long belt inside the foundry. This distributing belt moves on a roller track above storage bins and deposits sand in proper bins. In addition to the 50-mesh silica sand, a 200-mesh silica sand is used for an oil-bonded core mix that is required occasionally.

Incoming bulk cement of a high early set type is dumped from enclosed railroad hopper cars through a grating onto an elevator for movement to a 600-bbl outside storage silo. As cement is required, it is transported by a screw conveyor from the silo to a weigh hopper.

Used molding material (sand and cement) is reclaimed after shakeout by feeding through a hammer mill which breaks down the bond. No cement is removed. Material is pulverized to a 50-mesh grain fineness comparable to the grain size of the original sand, and is cascaded in front of an exhaust outlet to remove most of the fines. The reclaimed sand moves by screw conveyor to a storage bin, and when needed is incorporated in the regular sand-cement mix. About 75 per cent of used sand is reclaimed or is used in lump condition as filler material in large castings. The balance of the mold material is hauled away.

Sand Mixtures—New sand is carried from storage to a large sand hopper in the mulling area by a front end loader. An operator-controlled gate valve delivers 900 lb of new sand by gravity from the hopper to the skip hoist bucket. A like amount of reclaimed sand is delivered to the bucket by screw conveyor. One hundred eighty lb of cement is weighed and dropped into the bucket. The material is elevated and dumped into a 2000-lb capacity muller. Water is added within a range of 6.8 to a maximum of 8.6 per cent. If less than 6.8 per cent water is added, the sand is weak and "works" poorly. If more than 8.6 per cent water is added the sand will not air dry within the normal allotted 72-hour drying time. After mulling for three minutes, this facing sand mixture is delivered by electric trucks to the various molding stations or pits.

Backing sand mixture consists of 1800 lb of reclaimed sand and 90 lb of cement. To provide improved peeling characteristics and minimize metal penetration in castings with extra-heavy sections, about 5 per cent seacoal is added.

Molding—Both pit and floor molding are done. Two molding pits, each 20 x 120 ft, are available. Pits are separated and surrounded by concrete aprons, permitting electric trucks to deliver sand, cores and other material to the area. Largest flask size is 8½ x 10 ft. Work larger than that goes into the pits. A jolt molding machine and a rollover draw machine adaptable to jobbing work are available and flexible enough to handle any mold or core up to 2000 lb including box and plate. The rollover machine has a draw of 26 in.

Each molder has a helper. They work in the pits as a team preparing molds directly from patterns and blueprints. Molding techniques vary somewhat from conventional practices. Hardening properties of cement bonded sand are advantageous since the full strength of the mold or core may be reached before being moved. The cement begins to set soon after being mixed and hydration proceeds so fast that sand becomes unfit for use in a little over 5 hours.

Cement-bonded sand need not be rammed as hard as green or dry sands. Generally the sand is tamped only enough to fill all the details of the pattern and to eliminate soft spots. Depending upon the weight of the casting, 1 to 3 in. of facing

sand is used. Lump sand from previous molds is used as a fill for molds and light-weight blast furnace slag is used as a fill for cores. A ground coke wash is applied to mold and core surfaces with a spray gun or brush. In general, cores or molds are made one day, the wash is applied the second day and the mold is closed and poured on the third day. Some extremely large castings take several weeks to produce, however.

A sensitive electronic humidity indicating device is used to determine accurately when a mold is sufficiently dry to be poured. Experience has shown that when evaporation of moisture from the mold drops to about zero, the mold is dry enough to pour. When the instrument is placed in contact with the mold surface, it detects the evaporation of moisture. Since cement-bonded molds always contain residual moisture below the surface, the dryness check made by the instrument gives satisfactory control.

Coremaking—Most cores are made of cement-bonded material and are air dried. A small quantity of oil-bonded cores is used, and for these a 200-mesh washed silica sand is specified. These cores are used in certain heavy section castings where a light core is mandatory or in extremely light sections where good collapsibility is desired.

On occasion, extremely large cores are made without use of a corebox or arbors. Mold for the outside of the casting is made first and then lined with a layer of sand the exact thickness of the desired wall of the finished casting. Core is rammed up within this layer of sand and after hardening is removed. Sand lining is stripped out of the mold. Mold and core are checked and blacking applied and air dried before returning the core to the mold for pouring.

Many shapes are made by using a sweep instead of a corebox or pattern. Substantial pattern cost savings are said to result from this method which is adaptable to cement-bonded sand.

Melting—Metal is melted in a conventional acid-lined, front-slagging, continuous-tapping cupola. The cupola has a 96-in. shell lined to 78 in. with a monolithic refractory blown by an air placement gun. Slag is tapped to slag pots and removed to an outside dumping area. Melting capacity is 45,000 lb per hour and is more than sufficient to handle present production. A wall opening in back of the cupola permits the drop to be removed promptly from the building when melting is completed.

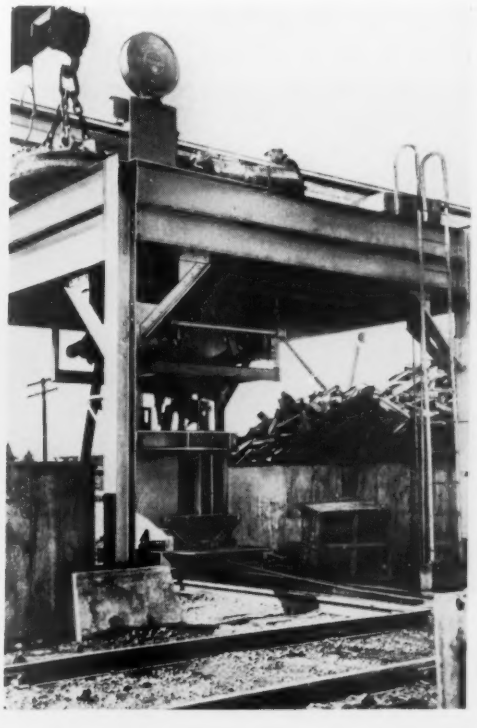
Currently, metal is poured two days a week. Production amounts to 1 million lb of clean castings monthly. Yield is about 70 per cent.

The outside scrap storage yard is serviced by a 10-ton overhead crane running on a 400-ft track. Span is 47 ft. A 66-in. electric magnet is available for loading and unloading scrap. Yard crane also is used for moving flasks, ladles and other equipment stored outside. The crane is an integral part of the mechanical cupola charging system consisting of an iron loading platform, coke and limestone hopper, bucket transfer car and monorail type cupola charger.

Coke is unloaded from railroad hopper cars to an inclined belt and moves directly into a compartmented coke-limestone hopper. Excess is stored in piles for future use. Limestone is trucked in locally and placed in storage hoppers. The charge is made up of stripped automotive engine blocks, steel rails and pig iron.

The yard crane loads material for the charge into the large hopper at the iron loading platform. A scale is used by the crane operator to verify weights of each portion of the charge. When the

Magnet and yard crane are used to drop charge materials into a scale hopper before charge drops into bucket below the platform



Lowering core section into a pit mold. Light-colored material inside the core is light-weight blast furnace slag used as fill

correct amounts of materials are in the hopper, the charge is dropped into the charging bucket, which then is transferred by a cable-driven pickup car to a spot underneath the coke-limestone hopper. Discharge from each compartment of this hopper is individually controlled through hydraulically-operated clamshell gates into a weighing hopper and then into the charging bucket.

The loaded charging bucket is hooked onto a monorail type cupola charger and elevated to the cupola opening. All of the charging functions are controlled by one man located in a pulpit convenient to the unit. Over-all time cycle for a charge is three minutes.

Metal Analyses—In general, charges consist of 2500 lb of metal plus the coke, limestone and alloys. One common charge consists of 625 lb malleable pig, 750 lb steel rails, 673 lb engine blocks, 62 lb return scrap, 10 lb Fe-Si briquets and 9 lb Fe-Mn briquets to provide a composition with TC ranging between 3.00-3.25, Si 1.40-1.90, Mn 0.50-0.90 and P 0.20 max.

A standard ductile charge consists of 1250 lb of malleable pig, 1250 lb steel rails and 38 lb Si briquets. An average composition of the ductile iron is within these ranges: TC 3.50-3.80, Si 2.20-2.80, Mn 0.35 max, P 0.15 max, and Mg 0.045 min.

Alloy additions are made in the ladle or included with the charge, depending upon the amount of the addition. Ductile iron is made to all the standard specifications as well as to special customer requirements. Complete chemical and physical tests are made on each heat or on each ladle as specified. Chief metal characteristics are a fine-grain structure that permits machining to a clean smooth surface and a brinell hardness which can be controlled to suit the purpose for which the castings are engineered.

Pouring—Metal at 2800° F is tapped directly into preheated ladles. Ladle capacities range from 1000 to 65,000 lb. When the casting being poured requires more metal than the capacity of any single ladle, one or more additional ladles are used. Metal temperature is maintained under an insulating cover of ground coke that is skimmed before pouring starts. Metal is conveyed to pouring areas by either 30 or 60 ton overhead cranes.

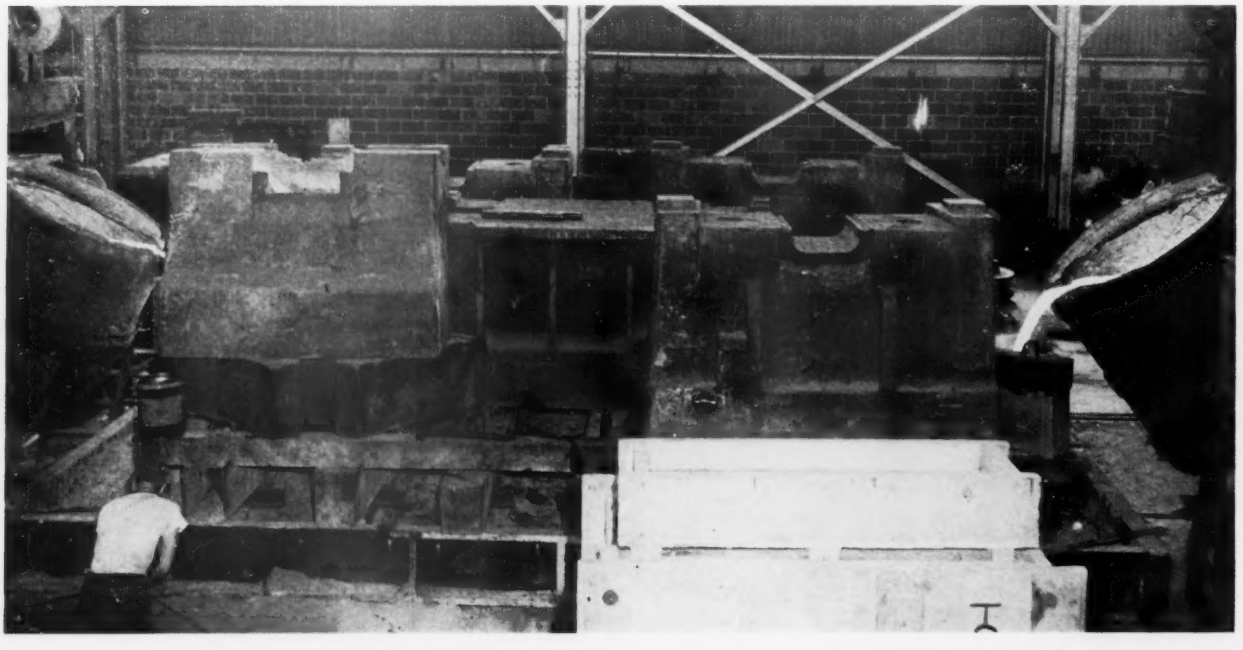
Cement-bonded pouring basins are premade and incorporated in every mold. These are designed to provide the correct pouring rate for the casting being poured. Each basin contains a dam to control metal flow. Rush of metal from the pouring ladle is slowed down by the dam and the metal seeks a level in the basin. Clean metal comes off the bottom and flows into the casting through ceramic gate cores. Six sizes of pouring basins with a down gate of from ¾ to 3 in. diam are used.

During the first four months of operation, scrap percentage averaged 2.70. This low figure can be attributed to rigid inspection standards maintained by two men who are responsible only to the foundry superintendent. Core, mold and casting inspection reports are made daily, and constant caution is exercised to guarantee that cores and molds are made and assembled as accurately as possible. At least 90 per cent of total inspection hours are performed before metal is poured.

Cleaning—After pouring and cooling, castings are removed to the chipping floor. Because work size and complexity vary, manual chipping operations are used. A crew of 15 cleans castings on a 5-day week, 8-hr-day basis. Another crew handles shakeout, pit digging and unloading operations. Interior rail and truck ramps are adjacent to the chipping floor for loading and shipping castings.

A small percentage of the castings produced which require more than the normal 3 per cent as-

Large castings often require metal from more than one ladle. Note the special pouring basin engineered to provide the correct pouring rate



cast ductility are annealed in a small furnace or, if too large, are sent out for annealing.

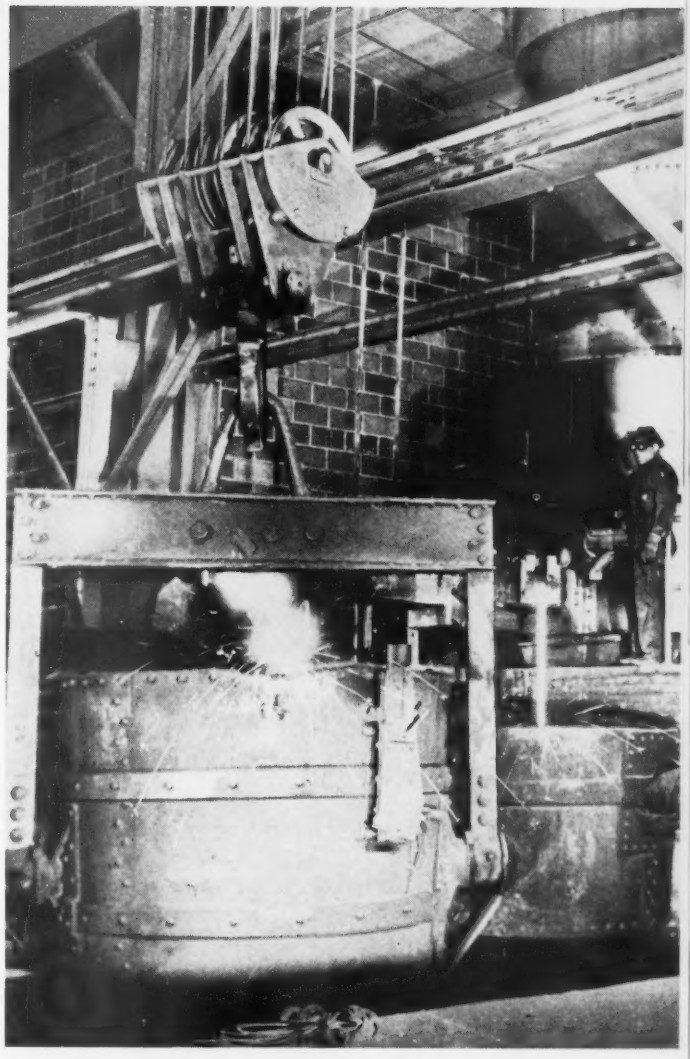
In cool weather, comfortable working temperatures are provided by four oil-fired heaters of 220,000 cfm capacity each. Dust and smoke are removed from working areas by overhead fans, capable of providing a complete change of air every four minutes. A dust collecting system is connected to the hammer mill, sand hoppers and mulling units to remove dust and fines created in those areas.

Training Program—To insure an adequate, well-trained reserve of young manpower, the company has an apprentice training program that covers 6500 hours of work processing in various departments. Four foundry apprentices are enrolled in the present plant apprentice school. Training schedule for these four men breaks down as follows:

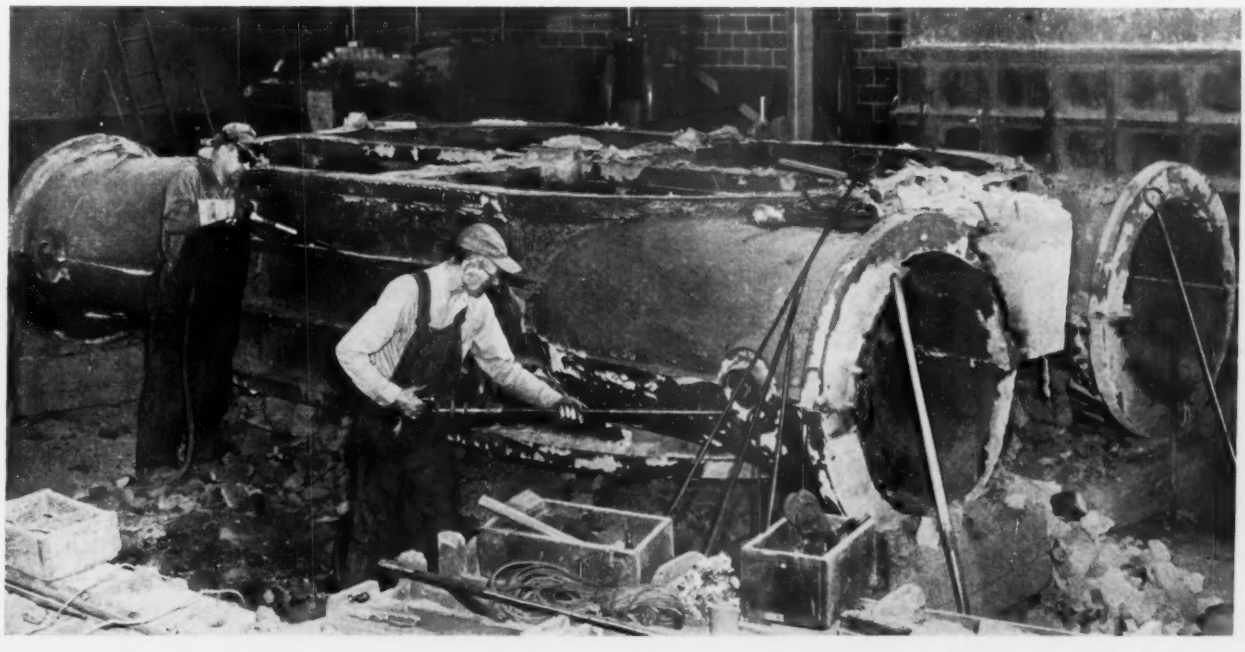
Task	Hours
Coremaking	1200
Molding	3850
Cleaning	200
Melting and pouring	200
Foundry inspection	200
Machine erection	300
Forge shop	100
Blueprint reading	150
Shop theory and practice	150
Related mathematics	150

Three patternmakers are employed in the well equipped pattern shop altering, repairing, building and performing general maintenance on pattern equipment. Most large patterns are purchased under the supervision of the pattern shop.

Individual lockers and a modern wash and shower room are provided for the 103 foundry employees. A foundry office, engineering and planning offices, inspection laboratory, maintenance room, stockroom and storeroom complete the modern facilities.



Metal at 2800°F is tapped directly into preheated ladles. Slag is tapped into the smaller ladle



Because work size and complexity varies, manual cleaning techniques are used by a crew of 15 men

Gating and Risering in the Brass Foundry

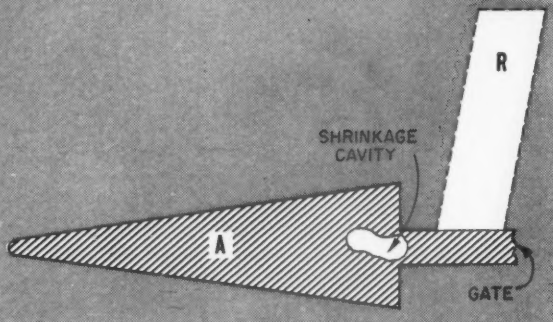


Fig. 1—Wedge can be cast in manganese bronze with the gate shown, but not in the red metals

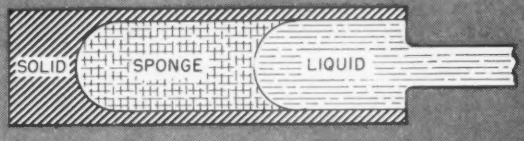


Fig. 2—Cylinder fed by gate at end shows how trapped gas hinders penetration of feed metal

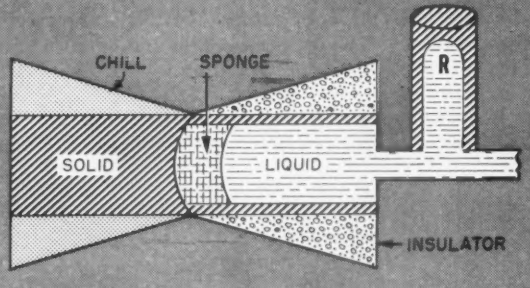


Fig. 3—Wedge-shaped chills and insulators offer ideal but costly way to make this casting

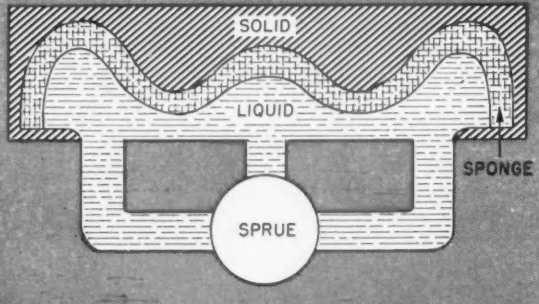


Fig. 4—This layout provides simpler but still effective way to make casting shown in Fig. 3

IN A PREVIOUS article the relationship between gating and such troubles as misruns, cold shuts and dirt inclusions was discussed. These are simple problems compared with the one which remains — the feeding of the casting to make up for the large shrinkage which occurs when the metal changes from the liquid to the solid state.

It has been mentioned that feeding the red brasses and bronzes is particularly difficult because of their long, slow freezing range. Even the generally accepted principle of directional solidification fails to apply when a large section of casting immediately adjacent to the gate is much heavier than more distant portions.

Take, for example, the wedge illustrated in Fig. 1. Made in manganese bronze this would offer no particular difficulty with the gate located as shown, provided the gate and runner are of sufficient size. With the red metals a shrinkage cavity is likely to occur at the gate. No matter how large the gate, the metal within it is certain to freeze while there is still liquid metal in the casting. The casting will act as a riser to feed the gate.

One way to overcome this difficulty would be to use a riser (R) as indicated by the dotted lines. For small castings this would be wasteful of nonproductive metal and molding labor. A more economical method would be to move the gate to the point (A). Even then the exact location, size and contour of the gate would be a matter of trial. Perhaps a strainer core, limiting the rate at which the metal enters the casting cavity, would help. If the quality of metal is variable, so that the fluidity changes from day to day, the riser (R) might be the only reliable solution, wasteful though it may be. It is evident that the best method of gating what looks like a simple casting can be quite a confusing job.

Solidification Principles—What happens when a metal solidifies, and why do different compositions behave differently? Possibly no one knows all the answers but useful theories have been advanced. We do know that solidification starts with the formation of tiny crystals in the molten mass and that these crystals continue to grow in size so long as there remains liquid metal to feed them. It is also true that, while this is going on, large crystals may devour small ones and that until a small crystal reaches a certain critical size it may become the victim of this sort of cannibal-

This month Mr. St. John turns to the complex problem of feeding castings to make up for shrinkage during solidification. This article is the sixteenth in his series on practice in the brass foundry

By HARRY ST. JOHN
Foundry Consultant

ism. If the finally solidified metal is composed principally of large crystals the casting will be weak and porous.

To understand why crystals form exactly where they do, we must assume the existence of what are called crystal nuclei. No one has ever seen a crystal nucleus, even under the most powerful microscope, but if we define a nucleus as a point in a mass of molten metal where a crystal will eventually start to form, no one can take issue with us. We need not concern ourselves here with the particular arrangement pattern of oscillating atoms which results in crystal birth.

To obtain the dense, fine-grained structure we want in the casting, we need a large number of

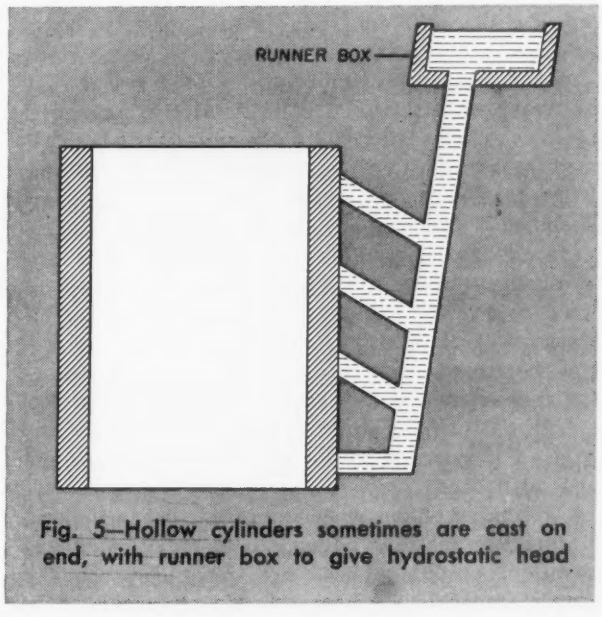


Fig. 5—Hollow cylinders sometimes are cast on end, with runner box to give hydrostatic head

crystals, all starting to form at the same time, so that none has an opportunity to grow to large size at the expense of its fellows. For this result let us assume that we need two things—a large number of nuclei entering the race and an equal chance for all of them at the starting gate.

It is possible, as some theorize, that the number of nuclei present may be more or less, depending upon the presence of certain impurities or upon the treatment the metal has received during melting. We know, for example, that minute quantities of aluminum or silicon in the red alloys are responsible for large crystals and an undesirable structure, while small percentages of nickel produce the opposite effect. We also know that we get a somewhat similar result if the metal entering the mold cavity is excessively hot so that its central portion remains fluid for a long time.

An even more useful theory holds that an equal start, rather than the number of nuclei, is the important thing. We know, for example, that metal contaminated with aluminum or silicon yields a fairly decent structure if poured into a chill mold where the whole mass of metal is cooled more rapidly than would otherwise be the case. But the addition of nickel to a contaminated metal also improves the structure although it can hardly be supposed to increase the rate of chill.

This brings us to an interesting conclusion which is backed by a considerable amount of experimental evidence. If we can give the nuclei an almost equal start by rapid chilling of the metal, we can perhaps accomplish the same end if, in some way, we can cool the metal below the freezing point before crystals start to form. This phenomenon, variously called supercooling or undercooling, can be visibly demonstrated in the crystallization of supersaturated salt solutions. It almost certainly applies to metal solutions as well.

Some metal compositions—such as steel, the aluminum alloys and, to some extent, the copper alloys high in zinc—have a natural tendency to supercool. The temperature of actual freezing is well below the melting temperature. When freezing starts, its progression is practically instantaneous because all parts of the metal are below the theoretical freezing temperature. The high-copper alloys, on the other hand, have much less tendency to supercool. Following this line of reasoning we may believe that aluminum and silicon promote the beginning of crystallization at relatively high temperatures while nickel tends to favor supercooling. Curiously enough, superheating a copper-tin bronze far above its melting point and then allowing it to cool slowly before pouring into the mold also seems to favor supercooling.

Freezing Range Varies—With some metals, simple shapes of heavy section are the easiest to gate; the same shapes in the high-copper brasses and bronzes are most difficult. The copper-base alloys can be divided roughly into two classes—the high-shrinkage alloys and those having a

comparatively low shrinkage. The high-zinc brasses, silicon brasses and bronzes and the aluminum bronzes are examples of the first class; the red brasses and tin bronzes belong in the low-shrinkage group.

For the high-shrinkage alloys, which have a short freezing range, we must provide heavy gates and ample risers, often risers even for rather small castings. A high casting yield is out of the question. With manganese bronze we may not get more than 40 per cent. With silicon and aluminum bronzes we can do a little better. Someone may ask why silicon and aluminum as impurities in the red brasses and bronzes prevent supercooling and yet the silicon and aluminum bronzes apparently supercool and have short freezing ranges. An attempt to answer that would lead us into highly technical speculation. Let's just accept the facts as they appear to be and go on from there.

Directional solidification works well with the high-shrinkage alloys. By this is meant the use of a gating system such that freezing begins in a light section farthest from the gate or riser and progresses toward the gate or riser, which is last to freeze. A wedge or cone is the ideal example. Referring again to Fig. 1, the riser (R) will serve to keep the gate open and supply the metal needed to feed the heavy part of the casting.

Let us examine more closely what happens when

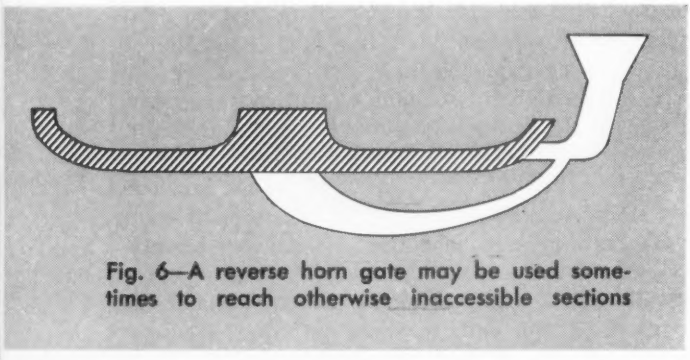


Fig. 6—A reverse horn gate may be used sometimes to reach otherwise inaccessible sections

we have the slow crystal growth characteristic of the red brasses and tin bronzes. The metal which comes to rest against the moist sand of the mold face is chilled and freezes immediately, forming a thin layer of small crystals, some of which lie parallel to the mold face while others are perpendicular to it. This thin layer is the dense, impervious skin of the casting so often removed in machining, to the detriment of pressure tightness. The parallel crystals remain small because their growth is blocked at each end while the perpendicular crystals grow into the central mass of liquid metal which tends to become more and more concentrated in the low-freezing elements such as lead and tin.

If the growth is sufficiently slow and prolonged, the center of the section becomes spongelike with branches of the large dendritic crystals interlaced like the limbs and twigs of adjacent trees.

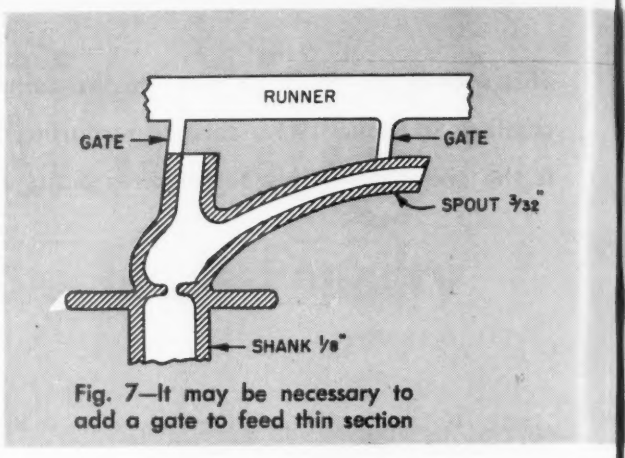


Fig. 7—It may be necessary to add a gate to feed thin section

These voids will fill and become fairly solid if sufficient feed metal reaches them but it is difficult for the most fluid metal to penetrate very far through the sponge. Any gas released at this time is trapped and still further interferes with the penetration of feed metal.

Casting Cylinders—Fig. 2 illustrates this situation in a cylinder fed by a gate at one end. It is common practice to make thin disks by slicing a stick cast in this manner, and frequently a large proportion of such disks are porous at the center. An ideal but costly way to make such a casting is shown in Fig. 3. The end of the casting farthest from the gate is frozen quickly by means of wedge-shaped chills; the end nearest the gate is kept liquid by wedge-shaped insulators while a riser keeps the gate open and supplies feed metal. In this way true directional solidification is achieved but at a prohibitive cost. A simpler method which works reasonably well is shown in Fig. 4, looking at the casting layout from above. The point to remember is that no gate or riser will feed distant points adequately.

Hollow cylinders are sometimes cast on end as shown in Fig. 5, using a runner box to give the necessary hydrostatic head. Sometimes a reverse horn gate may be used to reach an otherwise inaccessible heavy section, as shown in Fig. 6. The pattern for such a gate must of course be made as a separate piece and removed from the mold with care.

A special problem is encountered in the making of plumbing castings which are to be polished and chromium plated. These are designed with the thinnest possible sections and yet they cannot be poured hot if an acceptable chromium finish is to be obtained. The ladle temperature at the start of pouring cannot safely be much above 2200° F (2180° F is better) and you can't go far with a 3/32-in. section at that temperature. Long thin spouts are likely to misrun.

One way to keep out of trouble is to pour only four or five molds from a ladle, but that is costly business if there is no convenient place to put the rest of the metal. Also, the pourers will never keep up with a fast molder by pouring less than 12 or 15 molds from each ladle. It frequently becomes necessary to feed the thin section with an

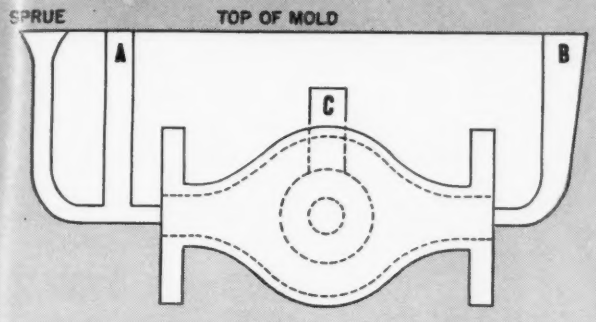


Fig. 8—Risers (A) fed directly from the sprue, (B) from a distance and (C) blind

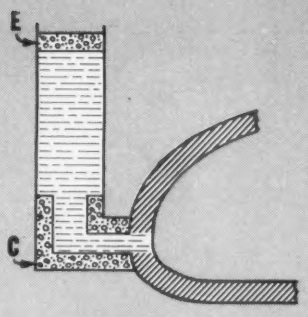


Fig. 9—Metal enclosed by insulating sleeve (C) will be kept hot

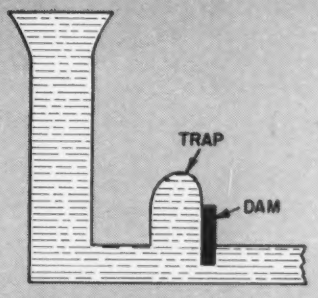


Fig. 10—Dam in gate, near sprue, helps to keep big castings clean

added gate as shown in Fig. 7. The metal must be good. A little nickel will also help.

Gating Recommendations—No brief presentation on the gating of the red metals can possibly cover all of the complexities. The purpose here is to establish the fundamentals on which judgments can be based. Each pattern is a separate problem. It may be well, however, to list a few things which usually should be done.

1. Whenever possible, gate to a surface which will later be machined. This will avoid some scrap losses due to surface dirt.
2. For the high-shrinkage alloys use ample gates and employ risers to feed heavy sections.
3. For the low-shrinkage alloys use smaller gates and avoid the use of risers on small castings.
4. When gating into a thin section use a thin flat gate.
5. Bear in mind that with the red alloys, a riser, no matter how heavy, will not feed very far. If possible, add a gate to reach any section which is consistently spongy at the center.
6. Use fillets where gates enter castings and streamline these carefully if casting surface is not to be machined.
7. If there is to be a choke in the gate, make sure that this will not freeze shut before the casting finishes feeding.

Gating Large Castings—With castings weighing 100 lb or more the pouring temperature becomes less critical since not more than three molds will be poured, often not more than one, from a single ladle. The use of risers cannot be avoided, even for the low-shrinkage metals. For very large castings several risers, sometimes more than one sprue, usually are necessary.

A riser fed directly from the sprue, as shown at (A) in Fig. 8, is most effective because it contains hot, fluid metal. Risers at a distance from the sprue, like (B), contain metal which feeds less effectively because it has been partly chilled on its way to the riser location. Also in Fig. 8, (C) represents a blind riser, so-called because there is a considerable layer of sand above it, whereas (A) and (B) are open to the atmosphere at the top of the mold.

Blind risers have the disadvantage that, as the metal shrinks, the feeding action of gravity is partially offset by the reduced air pressure set up at the top of the riser cavity. This is particularly true of brass, as compared with steel for example, because brass sands are fine and of comparatively low permeability so that atmospheric pressure works its way through the sand slowly and with difficulty. It will be noted also that a riser can be attached to the casting at the parting line, as illustrated by risers (A) and (B), or at some higher point in the cope, as illustrated by (C). The choice of method depends upon the design of the casting but as a rule the parting line is the preferred location.

Riser Insulation—The effectiveness of a riser can be increased and its weight diminished by the use of insulating sleeves. The metal enclosed by the sleeve (C) shown in Fig. 9 will stay hot and fluid longer than if it were in contact with moist sand. The cost of cutting the riser from the casting will also be reduced. In the same illustration, (E) represents a layer of exothermic powder placed on top of the metal as the riser fills. The heat of the metal sets off a chemical reaction in the powder which in turn develops more heat so that the metal stays liquid longer and feeds more effectively. These methods can be used separately or in combination. A heat-producing material can also be obtained in sleeve form. Surrounding the riser, it keeps the metal hot and permits the use of a riser having less cross section and less weight. All of these methods not only promote more effective feeding but also, by decreasing the weight of non-productive metal, increase the casting yield.

Another useful gadget, which helps to keep big castings clean, is a dam placed in the gate near the sprue, as shown in Fig. 10. Floating dross and dirt tend to lodge in the trap. The dam can be made from a split brick or, better yet, from a piece of artificial graphite. If the foundry, or some neighboring foundry, uses electric arc furnaces, electrode scrap offers a convenient supply of graphite for skimmers, chills and the like.

By this time it must be apparent to the reader that the gating and risering of nonferrous castings is more of an art than a science. Science has helped and will contribute more as time goes on but up to the present cannot wholly be substituted for experience and judgment.

Depends

Industry growth in the next decade will depend on people and their attitude toward their work. Ford Motor Co.'s program of attitude development and training for workers is described

By JOHN W. SCHNEIDER
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Dearborn Iron Foundry, Ford Motor Co.
Dearborn, Mich.

DURING the past ten years the foundry industry has undergone a revolution. This development was caused by application of new materials and new equipment which improved foundry processing, bettered working conditions and improved product quality.

There will be substantial growth in the next ten years, but it will be attributable in large part to people. How they think, how they feel, how they work, the level of their morale are important. Morale is the key to productivity. The difference between morale of an individual and that of a group is the difference between a breeze and a hurricane.

The morale of workers in a production plant has a direct effect on output. When workers are happy, abide by the rules and want to work, output is high. When workers are grumpy, resentful and suspicious of management, output is low—no matter what the product or what the wage.

Foremen Are Important—If morale is the key to productivity, then the foreman is the key to morale! It is of little importance how well the policies of vice presidents and managers are designed if they are not properly administered by the foreman. To foundry workers, whose morale we seek, the foreman is the company. Therefore, if worker morale is to thrive, grow and be high, morale building must be entrusted to the foreman, and he must be trained to do the job. That is especially true in medium to large foundries where relations between management and workers must, in many cases, be through a third party. It is for this reason that a comprehensive program must be instituted and conscientiously administered.

Many methods have been used in past years in effort to regain the balance of understanding between management and workers. Some of these programs were complicated and expensive. They were administered by representatives of management who were not closely associated with the workers and, therefore, did not know their problems or give them proper respect.

The foreman, by his position in the organizational structure, occupies the most important position in a morale-building program. It is he who must maintain the close relationship between management and workers, and train his people to know the true objectives of their company's business. Ford Motor Co. has put much study and effort into a program of improving management's relationship with the working force. The program was started in 1948 and up to this time rewards have been great; promise for the future is enormous. The approach, in the main, has been through the foreman. One of the first steps in the program was preparation of a supervisor's manual to unify and define the foreman's obligation, in the normal course of business, to the company and to his workers.

The first page contains a statement of policy signed by Henry Ford II. Immediately following

on

Above—Classroom scene in the personnel development program for line and staff supervisors

Left—At regularly scheduled meetings, supervisors discuss problems encountered on the job

is a list of the foreman's responsibilities. They are:

Duties Are Listed—"Within the scope of his position, each foreman possesses the necessary authority to fulfill properly the following management functions and responsibilities: To direct effectively the personnel functions of his working force, the foreman has responsibility for the requisitioning, accepting and rejecting of new employees. When the foreman receives new employees, he is responsible for the general introduction to his department and the application of proper classifications and pay rates.

"The foreman is expected to apply company personnel policies relating to labor agreements, employment, wage rates, employee conduct, safety and other personnel activities.

"It shall be his responsibility to give on-the-job training or instructions or assign other employees to do so.

"He shall control the promotion or demotion of his employees in accordance with company policies and labor agreements.

"It shall be his responsibility to accept complaints and grievances and investigate oral complaints and written grievances. He shall adjust complaints and grievances with employees wherever possible.

"In regard to discipline, the foreman shall instruct employees concerning improper actions including violation of plant regulations.

"He shall warn and reprimand his employees about improper actions and report such violations requiring disciplinary action to the Labor Relations Department.

"The foreman shall be responsible for granting leaves of absence, arranging vacations, holidays and week-end schedules.

"The foreman shall issue and enforce instructions with regard to safety of the individual and preservation of company property. He shall use precautionary measures against unsafe conditions.

"It shall be his responsibility to maintain good housekeeping and good safety practices.

"To develop and maintain quality standards, the foreman has responsibility for maintaining satisfactory quality of work and recommending changes in specifications to improve quality standards.

"To maintain cost standards, the foreman shall assist in the establishment of work standards and assist in the development of budgets.

"He shall check and report excessive use of material, labor and service costs.

"A foreman has the responsibility of maintaining production schedules necessary for required production.

"He shall assign employees to meet production schedules and maintain the required quantity of work. In this regard he shall requisition employees and authorize necessary overtime. Foremen are required to work with general foremen and other foremen on related production problems and recommend equipment layout changes when necessary.

"The foreman is required to utilize service departments effectively. He shall request the services of engineering, labor relations, production control and quality control representatives on matters relating to their functions when required.

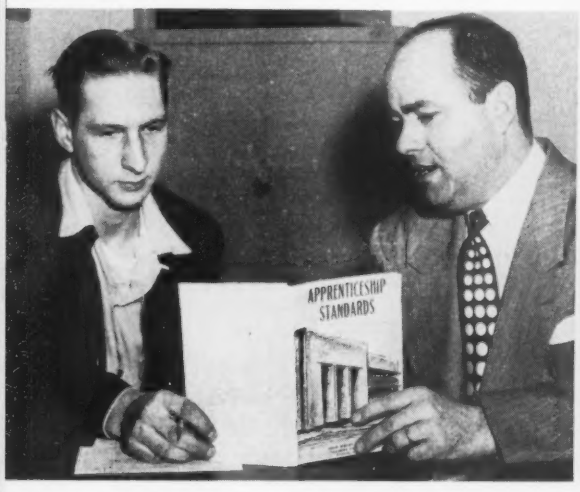
"To contribute to company and broad over-all management policies, the foreman has responsibility for assisting in the development of improved methods, facilities, tools, equipment, processes, and materials and reporting such changes to proper authorities.

"Our foremen are expected to perform such other duties as may be delegated but no work of a similar nature to that of workers supervised except for emergency or training purposes."

Responsibilities Are Specific—Every attempt has been made in that list to leave little doubt in the mind of the foreman concerning his responsibilities and attendant authorities with which to carry out those responsibilities.

Today, there is an increasing need for training, not only for future foremen but to keep present foremen alert and dynamic. Up-to-the-minute instruction is possible through management bulletins published whenever the need arises. Weekly conference meetings are held for all foremen to keep them abreast of latest company policy or to give them information that may affect their employees. These meetings are an important part of the two-way management communication program. Conference subject material is previewed by vice-presidents, general managers, managers and superintendents, for they, too, meet weekly to discuss the subject material discussed later by the foremen.

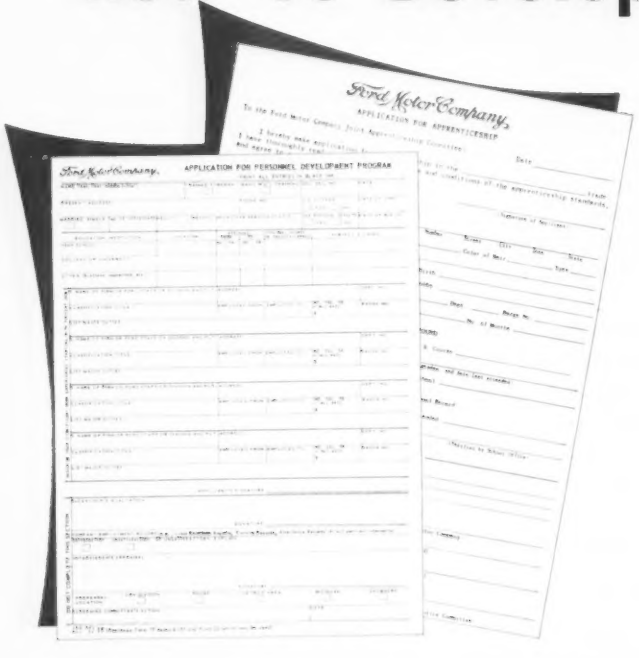
In preparation for the future, Ford has established a personnel development program to prepare suitable candidates for the management team.



Applicant, left, discusses his qualifications with the hourly personnel supervisor as first step in apprentice training for patternmaking

Training instructor tells applicant about all phases of the apprenticeship program — class work, on-the-job work and the studies involved

How To Develop Foundry Talent

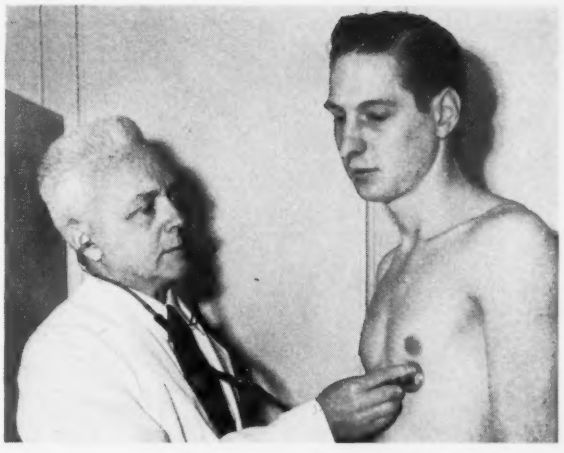


Sample application blanks for apprenticeship, foreman and basic management training programs

By ROBERT H. HERRMANN
Associate Editor

ONE of management's most pressing needs today is a supply of well trained, qualified junior executives—a solid bench, as the athletic coach would say, to fill vacancies as they occur on the first team. Rapid expansion in all industrial activity, in specific industries and in individual plants has created a need for more supervisory-management men as well as for replacement of supervisors who leave the industrial scene.

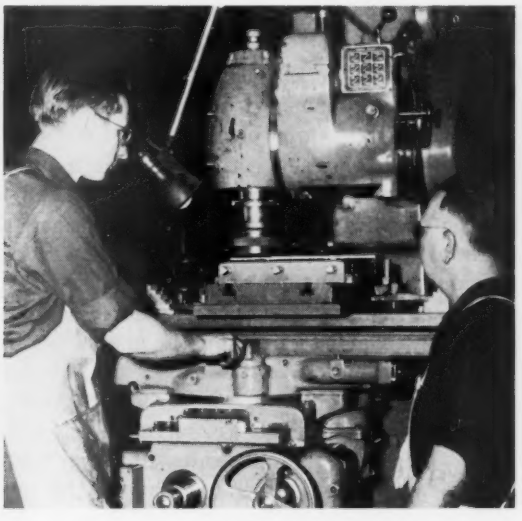
Good managers don't just grow; they are trained. Recognition of that fact is gaining momentum, and training programs have been developing in many companies. Ford Motor Co., Dearborn, Mich., has a conscientious, three-point plan which covers training of apprentices who want to become journeymen, employees who are training for foremen's positions, and basic management preparation. Ford's plan has the one essential ingredient for success; it was initiated by and is



Applicant receives a thorough physical check-up before his acceptance into apprentice training

Pattern shop head discusses schedule. Meeting serves to acquaint applicant with the manager

Applicant meets the line foreman and general foreman prior to starting the training course



A journeyman patternmaker gives on-the-job instruction to the trainee during shop sessions

checked regularly by members of top management.

Records are kept on each person participating in the program. Quarterly reports, providing an over-all picture of the entire program with particular emphasis on the management development group, are submitted to the vice president in charge of industrial relations.

Journeyman Training—First phase of the program, open to men 18 through 26 years of age, is apprenticeship training leading to journeyman standing.

The interested worker makes application to the Hourly Personnel Office. To be eligible for acceptance, the applicant must be a high school or trade school graduate or have equivalent education. Next step is to test the applicant on his mechanical and mental ability. If successful, the man files a written application which is reviewed with the results from these tests. In personal interviews with the union and company representatives attention is given to his school grades, his outside activities in connection with formal schooling, armed services education and training, previous work experience and the work record he has made at Ford.

After this preliminary screening, his application is sent to the Joint Apprenticeship Committee made up of company and union representatives. If application is approved, the applicant's name is put on an eligibility list, and he is placed as openings develop. The program involves 8000 hours of work experience plus 576 hours of schooling, on the apprentice's own time. Apprentices in the Detroit area attend classes at Henry Ford Community College and the Ford Motor Co. pays the tuition. Two classes of 1½-hour duration are held each week. The apprentice may apply for transfer to an apprenticeship training course different from the one in which he started if his interest changes or his experience or record indicates that he might do a better job in another field. His grades and work record, of course, have a bearing on whether or not he is permitted to make the change.

Foremen Training—Normally an employee on his own initiative makes application for foremen training through his personnel activity. However, in some cases, the outstanding work of a man

Apprentices attend 576 hours of classroom instruction on their own time. Work experience sessions take 8000 hours

might come to the attention of his department supervisors or supervisors of another department. The observing supervisor might then discuss the man's potentialities with the plant manager, who will watch the man's work and call him into his office for interview. At this informal meeting, the manager usually discusses the worker's ambitions and what he desires in his work and life. Training might be recommended in a line considered necessary to develop the man's potentialities with a suggestion that he apply for foremen training. In such cases the man's application goes directly to the Trainee Foreman Selection Committee. Unsolicited applications first are reviewed by the personnel office before going to the committee.

Applicants must have a high school or equivalent education, and at least three years of shop experience. They are interviewed by the committee about their future plans, why they want to become foremen, hobbies, interest in community affairs and spare time activities. Voluntary participation in outside educational courses is a strong factor in influencing recommendation of the applicant. Immediately after the interview, the committee discusses the applicant's potential and votes to accept or reject him for training as a foreman.

If accepted, his name is placed on an eligibility list and his department manager is notified. Requests for a trainee foreman come from various departments and are filled from the eligibility list.

At that time the six-months' training schedule starts. Related conferences involve 110 hours on the applicant's own time, and conferences are conducted in the Ford engine plant by Ford personnel. Progress of the trainee is recorded in two formal reviews—one at the end of two months, the other after four months. Grades earned in each of the topics of discussion are sent to the trainee's general foreman, superintendent, and plant manager, to aid in evaluating progress of the trainee.

When training has been concluded satisfactorily, a letter of completion, a copy of the trainee's final grades and his work record card is sent to his plant manager, who presents the trainee with a completion certificate stating that he has completed the program required for new foremen.

Basic Management Training—Foremen and other supervisors with at least one year of supervisory experience and two years of formal education or its equivalent beyond high school are eligible. Application is made to the employee's immediate su-

The foreman training program involves six months on-the-job training with 110 hours of classroom work held concurrently

College graduates who show technical and managerial aptitudes are trained for advancement

pervisor, who sends it with the man's work record and a letter of recommendation to the training section for screening and further development. Promising applicants are interviewed by the Divisional Basic Management Training Committee composed of four members of top management. This committee sends its recommendations to the divisional general manager for final approval.

Approved applicants embark upon a program of 3 to 3½ years rotated work experience obtained by replacing men absent because of vacation or sickness, or by periodically exchanging positions with supervisors over various operations. In addition, trainees are assigned special projects which might provide the study of and/or putting into operation a production method, cost system, employer-employee relations program, or similar endeavor.

Academic training consists of 30 credit hours of basic courses taken over a 2½ year period at Henry Ford Community College at company expense plus elective courses selected jointly by participant and his supervisors.

Upon completion of the program, the men are placed as needed into positions of elevated responsibility such as those of general foremen, superintendent, section supervisor, or department manager.

Basic management training provides opportunity for development of certain supervisory workers

Trainee Foreman Related Curriculum

Sequence of Presentation	Subject	No. of Sessions
1	Introduction to the Trainee Foreman Program	3
2	Line and Staff	4
3	Personnel Practices	5
4	Applying Company UAW-CIO Agreements	8
5	New Employes	2
6	Training	2
7	Improving Employe Morale	3
8	Characteristics of a Good Supervisor	2
9	Safety and Good Housekeeping	5
10	Fire Prevention	2
11	Quality	5
12	Statistical Quality Control	4
13	Methods Improvement	5
14	Production Schedules	5
15	Work Standards	8
16	Budgets and Cost Control	13
17	Basic Economics	10
18	Engineering Service	2
19	Materials	4
20	Equipment	4
21	Machines	5
22	Tools	5
23	Aids and Skills of Management	4
	Total	110

Basic Management Training Program

Curriculum for Detroit Area

BASIC COURSES:	Credit Hours
Industrial Organization	3
Personnel Management I and II	6
Elements of Statistics	3
Conference Leadership	2
Industrial Economics	3
Industrial Accounting	4
Report and Letter Writing	3
Industrial Budgets & Cost Control	4
Rapid Reading	2
TOTAL:	30

ELECTIVE COURSES

Product Design
Tools and Machines
Production Processes
Materials Handling
Motion and Time Study
Factory Planning and Layout
Production Control
Statistical Quality Control
Safety Administration
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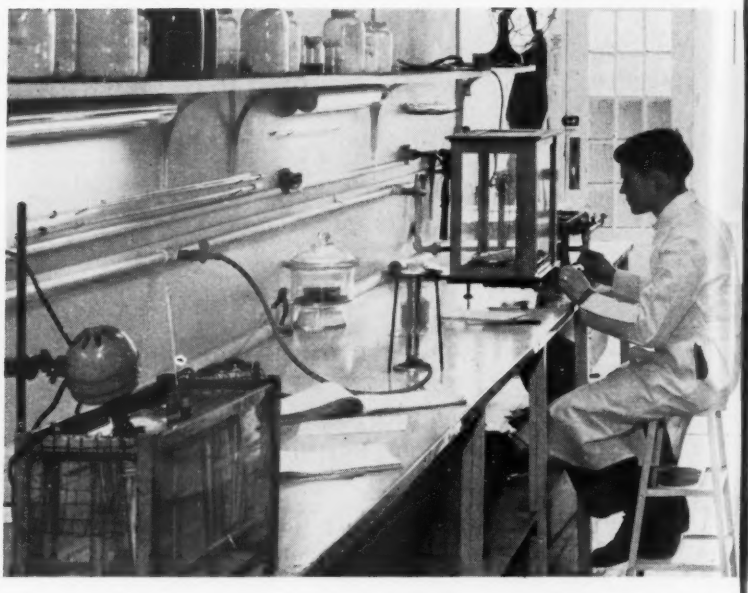
Effective Speech I
Presentation Techniques
Report and Letter Writing II
Automation and Operations Research
Basic Process Engineering
Welding Processing
Machining Processing
Assembly Processing
Stamping Processing
Statistical Laboratory
Industrial Management Planning and Control
Techniques of Effective Administration
Survey of the Automotive Industry
Industrial and Labor-Management Relations
Industrial Psychology
Human Relations

Short Cuts in

Analyzing Aluminum Alloys



Interested in time-saving modifications of standard procedures in analyzing aluminum alloys? Here are some practical, reliable methods for determination of copper, chromium, silicon, iron, nickel and bismuth

By CHARLES GOLDBERG
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DURING the course of quite a few years of analyzing aluminum samples, some time-saving modifications of standard procedures have been found to be both practicable and reliable. It is thought that a brief account of them will be of value to others.

Determining Copper and Silicon — Copper and silicon are, perhaps, the commonest elements associated with aluminum alloying and will be considered first. Copper is usually determined by either the volumetric iodine-thiosulfate method electrolytically or by a colorimetric method employing sodium diethyldithiocarbamate. The latter method is particularly good when copper is present in small amounts.

However, an alternative colorimetric method using ammonium hydroxide and alkali citrate has worked well here and is suitable for copper content up to 10 per cent. It is not necessary to isolate the copper first, as the silica is filtered off and elements precipitable by ammonium hydroxide are complexed by the citrate. Iron does not appreciably interfere up to 2 per cent. Other color-forming elements—nickel, cobalt, chromium—interfere, but allowance may be made for them unless they are present in high concentration. The procedure is as follows:

Add to a 0.5-gram sample in 500-ml flask, 10 ml of concentrated, c.p. hydrochloric acid in small increments, and when the strong reaction has subsided, 10 ml of concentrated, c.p. $HN0_3$. After a moment add 15 ml c.p. 70-72 per cent perchloric acid and heat until copious white fumes are emitted. Let cool a few minutes. Add carefully 25 ml distilled water, swirl and warm gently until all salts are in solution. Filter the silica through a

No. 41 Whatman (or equivalent) filter paper and wash six times with distilled water. When filtering, keep the solution one-half inch or more below the top of the filter paper. Perchloric acid, when retained by the paper, seems to concentrate near the top of the paper and will later, during ignition, cause a sputtering.

Transfer the filtrate to a 200-ml volumetric flask and add 75 ml of ammonium hydroxide, ammonium citrate solution (20 grams ammonium citrate, 73 ml distilled water, 27 ml concentrated, c.p. ammonium hydroxide). Then add 20 ml of ammonium hydroxide and dilute to the mark with distilled water. Stopper the flask. Carefully invert several times and after a few minutes read the light absorption at 650 mu and find the copper content from a standard curve.

Experiments indicate that silica dehydration is most complete from perchloric acid, rather than hydrochloric or sulfuric acids.

Iron and Nickel Analysis—If iron or nickel or both are to be determined, the need for separate samples may be eliminated by using one-half of the above filtrate for the colorimetric copper determination and employing the other half for iron and nickel assays. Add to one-half of the filtrate 10 ml 1:1 c.p. nitric acid and electrolyze the solution at 5 amps, with stirring. After five minutes add 1 ml 50 per cent sulfuric acid, 1 ml 10 per cent sulfamic acid and two drops of 1 per cent hydrochloric acid. When all the copper has been deposited, dilute the filtrate to 250 in a volumetric flask and mix well.

Transfer a 10-ml aliquot to a 250-ml volumetric flask and add ten drops concentrated, c.p. hydrochloric acid, ten drops of 3 per cent hydrogen peroxide solution and 25 ml of freshly prepared 10 per cent ammonium thiocyanate solution. Swirl and dilute to the mark with distilled water. Mix well. After 10 minutes read light absorption at 525 mu and find percentage of iron from a standard curve.

Another 10-ml aliquot is drawn for the nickel determination and to it, in the order given, are added, 10 ml 10 per cent citric acid, 3 ml iodine solution (25 grams KI dissolved in 50 ml distilled water, 13 grams iodine added and after the iodine has dissolved, diluted with distilled water to one liter), 10 ml 50 per cent ammonium hydroxide solution and, finally, 10 ml of 3 per cent sodium dimethylglyoxime aqueous solution. The solution should be swirled after the addition of each reagent. Dilute to 250 ml in the volumetric flask. Mix well. After 15 minutes read the light absorption at 525 mu and find the percentage of nickel from a standard curve.

Chromium—A colorimetric method for chromium which we have checked and found reliable is rapid and employs only two reagents. Dissolve 1 gram of the sample in a 250-ml beaker with 50 pellets of c.p. sodium hydroxide (about 5 grams). Add a little distilled water. Add 30 per cent hydrogen peroxide solution dropwise to complete oxidation of the chromium. Filter through a Gooch crucible and wash with 10 per cent sodium hydroxide solution. If the filtrate is slightly turbid, refilter. Dilute the clear filtrate with 10 per cent sodium hydroxide to 100 ml. Mix well and read immediately at 425 mu. The standard curve is prepared by treating samples of known chromium content exactly as described above.

Bismuth—Many methods have been proposed for the determination of bismuth in aluminum alloys. A combination of rapidity and convenience is found in the following method: Dissolve 0.5-gram sample with 10 ml of 40 per cent sodium hydroxide solution. Add 10 ml distilled water, then carefully add 30 ml of 50 per cent sulphuric acid solution. Add 10 ml of 50 per cent nitric acid. Boil until copper dissolves and the excess of nitric acid is expelled. Cool. Add 1 gram of hydrazine sulphate to reduce ferric iron. Boil five minutes. Cool to room temperature and add one-half gram sodium fluoride and 10 grams of thiourea (15 grams thiourea if Bi is more than 0.20). Dilute to 200 ml with distilled water. Filter through a dry filter paper and measure the light absorption of the filtrate at 425 mu.

We believe it is worth emphasizing that all standard curves for colorimetric comparison should be checked at least once a month. The citric acid solution used in the colorimetric determination of nickel becomes cloudy after about a week due to mold formation, and a fresh solution should be prepared every few days.

Current Trends in

Welding Steel Castings

Here's a rundown on the nature of recent welding advances and some tips on how to use them. This paper was presented last year at the T & O Conference of the Steel Founders' Society

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RECENT advances in welding are rapidly being adopted by the steel foundry industry. These processes include inert gas and semiautomatic submerged arc welding and metallic arc welding with iron-powder-coated and low-hydrogen types of electrodes.

These processes provide (1) improvement in quality of welding through more complete fusion and soundness of weld deposit and (2) economy and savings of labor by increased deposition rates of metal.

Most foundry welding is with coated metallic electrodes and will continue to be so in the foreseeable future. Iron-powder-coated electrodes provide increased welding speeds. Low-hydrogen-coated electrodes provide freedom of cracking in the weld and adjoining base metal, hence improved physical properties for repair and fabrication of carbon and low-alloy steel castings.

Semiautomatic submerged arc welding and metallic inert gas arc welding processes are used to best advantage for repair or cast weld fabrication of heavy sections that require a large amount of deposited metal. The submerged arc process is more economical for welding carbon and low-alloy steels, while the metallic inert gas process combines speed and quality for high-alloy steels, high-nickel alloys and special products.

A choice of more than one welding process usually exists for a specific application; however, one particular method may prove best under given circumstances. Adaptation of new welding processes requires establishment of procedures according to the type and size of castings involved.

Establishing Welding Procedures—Steel castings of increasingly higher quality are in constant demand. This is due among other factors to the needs of faster and more complicated aircraft, to the atomic age and to improved methods and equipment for inspection.

Several years ago steel castings below certain acceptable standards were scrapped and the remainder shipped without an attempt being made to improve them by repair welding. Recent technological advances in metallurgy and welding, together with developments in methods for detection of defects, permits production of castings of superior quality.

Large intricate castings are expensive to produce, and it is far more difficult to maintain high quality standards on them than it is for small simple castings. It is becoming a practice in the steel foundry, consequently, to produce cast weldments of intricate size and shape by welding together a number of simple component castings.

Each producer of steel castings should develop a written procedure for welding castings of every composition produced in his foundry. These procedures should be revised constantly to include new welding processes or materials that may apply to any alloy produced. A procedure for a given alloy should include as a minimum:

1. Classification—AISI, ACI, ASTM and/or composition.
2. Weldability of the material.
3. Type of electrode.
4. Welding process—metallic electrode, metallic inert gas, tungsten inert gas, submerged arc.

Arcair process is fast, economical method of removing defects in preparation for welding, but caution must be taken to avoid thermal shock

5. Heat treatment to be given prior to welding.
6. Preheating and/or postheating.
7. Maximum and/or minimum interpass temperature.
8. Size of electrode and recommended machine settings.
9. Postweld heat treatment.

Magnetic particle inspection is an excellent means of locating surface defects on carbon or alloy steel castings having a ferritic or martensitic structure. Such defects can be located on castings of any type with the use of penetrants.

Internal defects may be identified and located by means of radiography. When repairs are completed, these areas again should be radiographed to assure complete soundness. X-rays provide better negative contrast and are normally used if the section thickness is not such that gamma radiography is mandatory.

Specify Method—It may be desirable in given instances to specify the method to use in removal of defects. Arcair gouging is generally faster and more economical than grinding or chipping, but because of thermal shock it may be undesirable to use on cold castings subject to cracking. The air should be flowing prior to striking the arc to reduce the tendency toward carbon pickup by the base metal. All areas subjected to such gouging should be ground prior to welding to assure removal of any surface carbon and to provide a smooth surface for welding.

Care should be exercised to assure complete removal of defects. Welding over defective areas is a cause of gas and slag entrapment in the weld itself. Furthermore, defective areas at the root of welds promulgate cracking of the weld even after prolonged periods of service. Generous well rounded grooves should be made beyond the ends of any cracks of defects. This is more easily accomplished by means of grinding or arc or flame gouging than by chipping.

Assurance of complete defect removal can be obtained by magnetic particle inspection or dye penetrant. Field kits of dye penetrant are available with expendable spray cans at minor cost. Hairline cracks and small pores that are not otherwise visible are readily detected by these methods of inspection.

The problems connected with welding steel castings are, in general, similar to those of welding wrought steel of the same analysis. There is a little difference in welding processes, electrodes and techniques. The welding processes commonly used in foundries today include manual arc welding with coated electrodes, inert gas arc welding and submerged arc welding.

Tungsten Inert Gas Arc Welding—Inert gas arc welding may be divided into two categories, each of which is becoming increasingly important to the foundry industry. These are the tungsten inert gas-shielded and metallic inert gas-shielded processes.

The purpose of the inert gas atmosphere is to exclude the atmosphere from the weld, thereby preventing oxygen and nitrogen contamination of the weld metal. Welds made with these processes are more dense and contain less nonmetallic inclusions than welds made by other methods.

Submerged arc process is used for repair of large mild steel casting shown on previous page after the removal of defects by Arcair gouging

The tungsten inert gas-shielded process (commonly known as TIG) consists of an arc maintained between the base metal and a tungsten electrode surrounded by an inert gas atmosphere. Filler rod is fed into the weld in the same manner as in oxyacetylene welding; however, the intense heat of the arc provides for more rapid melting than is obtained with the oxyacetylene flame. The inert gas atmosphere is usually argon, but helium sometimes is used. Less argon normally is required than helium. Argon is a heavier gas and the welding process is simplified since its use permits greater variations in arc length.

A distinct advantage of tungsten inert gas welding in foundry use is on castings of special composition where welds must match the base metal. Commercial demand would not warrant production of electrodes indentical to each alloy. In many cases certain elements are lost in transfer through the arc and it would be virtually impossible to produce welds identical to the castings by means other than TIG welding. The foundry is in position to cast welding rod that can be used to make homogeneous repairs on castings that would otherwise have to be scrapped.

An addition of 2 per cent thorium to tungsten electrodes provides a marked increase of electronic emission. Thoriated tungsten electrodes provide closer control of the arc and improved arc stability over pure tungsten electrodes. Other desirable characteristics of thoriated tungsten electrodes include longer life due to decreased melting, less susceptibility to sticking and easier arc striking characteristics at lower open circuit voltages.

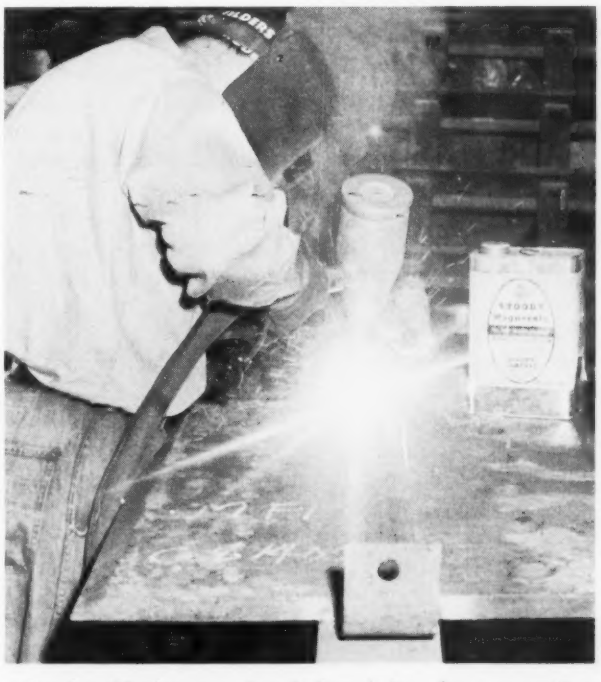
A recent application of inert gas welding was in repair of several tons of abrasion-resistant white cast iron. This material had been considered nonweldable and castings with imperfections previously were scrapped. In some instances castings were recast six or seven times to obtain a desirable product. This material was very hard and subject to thermal shock. Defects were removed completely by grinding and the welds made with $\frac{1}{4}$-in. diam by 8 in. long rod cast of the same material. Direct current straight polarity (electrode negative) was used in making these welds with a machine setting

of 375 amperes. The argon flow was 25 cubic feet per hour and the electrodes were 5/32 in. diameter thoriated tungsten. It was found necessary to preheat the entire casting to 1500° F and maintain this preheat during the welding operation to prevent warpage and cracking. The castings were given magnetic particle inspection to assure freedom of cracks and defects.

Tungsten inert gas welding is of value for modification of aluminum and magnesium patterns. Proper cleansing action of oxides is not obtained with direct-current straight polarity when welding these castings. The electrode becomes too hot and vaporizes if reversed polarity (electrode positive) is used with currents necessary for build-up of most patterns; therefore, alternating current with superimposed high frequency is recommended for this purpose.

Suitable coated electrodes are available for most carbon and low alloy steel castings, and tungsten inert gas welding which is relatively slower and more expensive than metallic arc welding would not be an economic choice under normal conditions. Further, if these steels are not completely deoxidized, gases given off during inert gas welding interfere with the welding process and are a source of porosity. The best application for this process by steel foundries is for high-alloy steels such as stainless steels, materials of composition not normally produced, high nickel alloys, etc.

Metallic Inert Gas-Arc Welding—The metallic inert gas arc welding process (commonly known as the MIG process) consists of coiled filler wire automatically fed as a continuously consumed electrode surrounded by an inert gas atmosphere. These wires are normally 0.035 to 1/16 in. in diameter and are available in spools weighing 25 lb or more. The larger diameters are a more popular choice for welding castings. This process is either fully automatic for production and fabrication of identical parts or it may be manually controlled. The semiautomatic or manually controlled process has the widest application for most foundry usage.



Grader blades are hard faced by the magnetic flux process, which is a recent development in conjunction with the submerged arc equipment

Principal features of the metallic inert gas process are high deposition rates of weld metal together with excellent physical properties due to the lack of nonmetallic inclusions. Deposition rates with the MIG process are two to four times those of coated electrodes. An average of 10 to 14 lb of weld metal is deposited an hour with MIG. According to a survey by the Marketing Research Department of *Steel*, 21 per cent of all production welding in 1954 was by automatic and semiautomatic methods. It was expected that 39 per cent of all production welding would be by automatic and semiautomatic methods by 1959.

The MIG process is particularly suited to cast welded fabrication. It is also excellent for repair welding steel castings of such size that appreciable amounts of deposited weld metal are required. For instance, a change in design required a raised hub on a pump impeller casting. The buildup of this hub by the MIG process, shown on p. 125, alleviated the necessity of producing a new casting.

The shielding gas for the MIG process of welding steel castings is usually argon with a small amount of oxygen (½ to 2 per cent) to stabilize the arc. Since this process requires about 50 cubic feet of shielding gas per hour, the cost of argon alone would be about $5 per hour. Less expensive means are therefore selected as a rule for repair of carbon and alloy steel castings. Carbon dioxide, which is far less expensive, is now being used as a shielding gas for fabrication of mild steel and will probably soon be utilized for casting repairs.

Occasionally low alloy or medium-to-high carbon steels will exhibit cracking tendencies in the case metal or weld when subjected to the heat of the MIG process. Preheating these castings to at least 300° F above the temperature normally required for welding with coated electrodes will as a rule be required to eliminate this difficulty.

The MIG process is used to best advantage in welding stainless steels and other high-alloy steels. Porosity due to occluded carbon monoxide gas frequently is encountered when welding carbon and low alloy steels, particularly if the carbon-to-silicon ratio is greater than 2 to 3 or if scale or dirt is present on the base metal. Recent developments in electrode wire have done much to improve this condition. Other methods of welding, however, normally offer advantage of economy and quality for carbon and low alloy steel.

Submerged Arc Welding—In the submerged arc welding process a layer of granulated flux completely surrounds the arc between the bare electrode and the base metal. Since the arc is covered by a flux blanket, the operator does not wear a welding helmet as required in the other arc welding processes. Submerged arc welding is either fully automatic or semiautomatic as required by the

nature of the work. For either process, the coiled electrode wire is fed continuously through a nozzle from a reel. The feed nozzle is within a hopper containing the flux that is gravitationally fed around the arc stream. The flux is of such composition that is cleanses the weld metal of impurities in addition to shielding it from atmospheric contamination. Fluxes of various compositions are available, many of which impart alloy additives to the weld. One major supplier of submerged arc welding equipment recently announced that it will supply flux that will provide deposited weld metal of any desired composition.

Semiautomatic submerged arc welding equipment has far greater application in the average foundry than fully automatic equipment. It is in the form of a portable welder with wire driving mechanism and a flexible attachment of tube through which the welding wire is fed. This tube also contains the current conducting cable.

Both 1/8 and 3/32-in.-diam wires are available for semiautomatic equipment; the latter is the most popular. Wire is available for mild and low-alloy steel as well as the stainless steels. The principal advantages of this process are high deposition rates, spatter-free welds and easy flux removal. It is possible to deposit up to 20 lb of weld metal per hour using currents up to 700 amperes with semiautomatic submerged arc welding.

A power plant of suitable size is essential for submerged arc welding. The minimum size of welding machine recommended is one that is capable of delivering 750 amperes at continuous-duty cycle. Certain advantages are derived from the use of a constant voltage welding machine as a power plant for submerged arc welding, for it will automatically maintain a uniform arc over irregular services and provide instant starting and recovery of the arc due to an initial high current surge.

Submerged arc welding probably provides the most economical means of making extensive repairs on large carbon or low-alloy steel castings. Its use in conjunction with carbon arc removal of defects is shown in Figs. 2 and 3, which illustrate repairs on a carbon steel casting for a ball mill. Cast weldments that require extensive welding are also economically fabricated by means of the submerged arc.

A recent development in conjunction with submerged arc welding equipment is the magnetic flux process. In this process, a magnetic flux contained in the hopper adheres to the welding wire to form a continuously coated electrode.

Welding of this type is quite similar to welding with coated electrodes, but the deposition rate is two or more times faster with the magnetic flux method. Hard facing and also austenitic manganese steel deposits are made with this process. P. 123 shows hard facing of grader blades with a deposit having Rockwell C hardness of 48 - 50. Mild steel wire, 3/32-in. diam, was used for these applications at 325 amperes, with the alloy and carbon imparted to the weld by the flux.

Bare tubular wire having the alloy contained within a mild steel sheath is now available that provides hard facing deposits of low or high alloy content. This wire is fed continuously from 50-lb spools by means of submerged arc welding equipment. No flux is used and the open arc characteristic with absence of smoke and fumes provides excellent visibility of the weld.

In one instance the open arc was used for hard facing a 4-ft bowl liner for a gyratory crusher. The base metal was austenitic manganese steel. The average speed of travel was 24 in. a minute at a welding current of 250 amperes. The thickness of a single layer was 3/16-in. Eleven pounds of metal were deposited per hour by this method. It is estimated that this type of hard facing will double the normal life of the crusher part and permit an operating rate of 25 per cent more tonnage per hour.

The high deposition rates attained with semiautomatic submerged arc welding equipment enable savings conservatively estimated up to 50 per cent where large amounts of metal are to be deposited. Large castings have been salvaged by this means that otherwise would have been scrapped. It is more practical for carbon and low-alloy steel than MIG welding in that expensive gas is eliminated and the deposited weld metal of this type generally is of better quality. Manual welding with coated electrodes is more practical than the submerged arc for smaller castings, for positions of welding other than flat or for welding in restricted places. The use of submerged arc welding is restricted to the flat position.

The metallic inert gas arc welding process is employed to make modification of a pump impeller casting as required by a change of design

Metallic Arc Welding with Coated Electrodes—Probably over 90 per cent of today's welding in the steel foundry is by manual arc with coated electrodes despite the fact that less metal is deposited per man-hour than with other processes. It is logical to assume that percentagewise semiautomatic welding will gradually increase in due time. Nevertheless if one considers normal industrial growth there is reason to believe the tonnage of coated electrodes consumed will be greater in five years than now.

The quality of welds on alloy steels has been vastly improved during the past few years through judicious use of low hydrogen electrodes. Problems of embrittlement and cracking associated with welding have diminished to a large extent. Difficulty with porosity and cracking can frequently be traced to storage conditions of these electrodes. They should be kept in a hot cabinet after the hermetic seal of the container is broken. If trouble is experienced due to moisture pickup, it usually can be rectified by baking the electrodes for about four hours at 400° F.

Low-hydrogen electrodes for carbon and alloy steels may be of either the lime or lime-titania type. Welds made with lime-coated electrodes contain less nonmetallic inclusions and they are recommended for highly restricted joints or for steels having poor weldability.

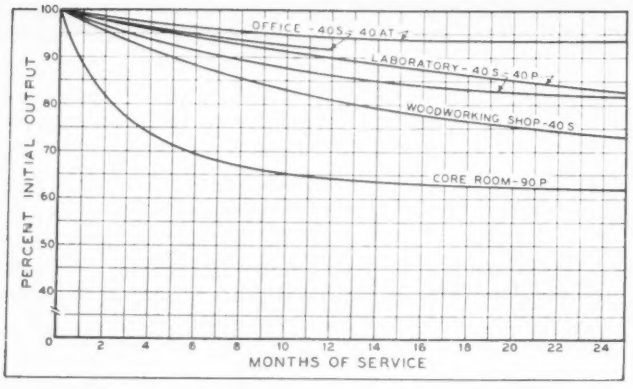
The use of iron-powder-coated electrodes is increasing. It is claimed that in some instances welding speeds are doubled through use of these electrodes in comparison with other types. Welds are characteristically smooth and easy to clean when made with iron powder electrodes. According to data obtained by D. B. Howard, it would be wise to conduct weldability tests on any iron-powder-coated electrode contemplated for use. He also indicated the iron-oxide iron-powder electrode (E-6027) is to be much preferred to the titania type iron-powder coated electrode (E-6024).

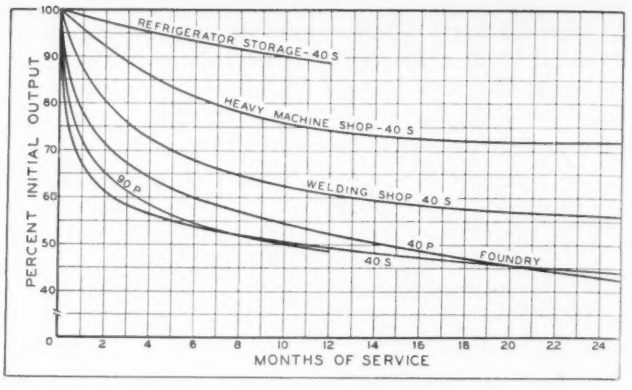
Low-hydrogen, iron-powder-coated electrodes are available for both carbon and low-alloy steels. These electrodes also have excellent operating characteristics, but cracking difficulty and/or porosity can be expected if they are not stored immediately in a hot cabinet after the sealed container is opened.

Testing Program—To determine the best procedure for each applicable welding process for every alloy produced, the foundry should establish a formal testing program for experimental welds. Selection of the initial alloys for the program would be based on their relative importance to the particular company. With few exceptions, the weld should match the base metal in composition as closely as possible. This can easily be determined by chemical analysis of the weld deposit.

The nature of the tests will vary according to the physical requirements of the finished product. In some cases standard tensile and guided bend tests will suffice. These are usually supplemented by hardness testing and microscopic examination. Individual alloys may require impact values, determination of corrosion resistance, density measurements, circular groove restricted bead tests, fillet weld tests, etc.

It would be logical to assume that electrodes purchased according to a given specification should provide consistent results regardless of who they were manufactured by. However, this is frequently not the case. Comparative tests should be made using electrodes from different manufacturers to determine which is best suited for a given application. It is recommended that the AWS-ASTM specifications for filler metal serve as a guide for these tests.





Figs. 1 & 2—Effect of light output depreciation due to dirty reflectors only is shown for high and low bay areas. Closed-top fluorescent fixtures were tested over 25 months

Lighting Maintenance

• • • Begins with Regular Cleaning

• • • Becomes more Economical with Group Relamping

By J. L. TUGMAN
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General Electric Co.
Nela Park, Cleveland

A GOOD lighting system deserves care. The price of the care is very small compared to the cost of neglect. That's the considered opinion of the busy industrial lighting engineer who collaborated in the development of this article. That's one of the reasons why he is so busy. Management wants to know how to give the care good lighting requires, and an engineer must study maintenance constantly to keep his counsel up to date.

By "good lighting system" we mean one which equals or surpasses the recommended standards of the Illuminating Engineering Society. If it qualifies by these standards, it is an important tool for industrial operations. It helps workers to see better and thereby to increase their safety and productivity potentials. Accidents and spoilage—consequences of neglected maintenance—are almost never fully represented in costs of operation. They run substantially higher in poorly lighted plants. Where neglected maintenance is the rule, an initially good system will fail its function. (This is not a good reason why poor lighting should be tolerated. We hire the eyes as well as the hands of labor. What the hands can do depends on what the eyes can see.)

The essentials of organized lighting maintenance are (1) proper cleaning (2) regular cleaning according to schedule and (3) relamping. This last essential has become such a special opportunity for economies it will be treated as equal in importance with cleaning in this discussion. Let us look first at the objectives of regular cleaning programs.

More Light on the Job—What we seek is an optimum return from our investment and operating cost. The greatest loss of light results from dirt accumulations on lamps and fixtures. Losses from

TABLE I—Lamp Dirt vs Luminaire Dirt

Area	Lamp Wattage and Reflector Finish	Total Luminaire Depreciation (Dirty Lamps and Reflectors)	Reflector Depreciation (Clean Lamps and Dirty Reflectors)
Office	40, aluminum troffer	6%	Negligible
Refrigerator storage*	40, synthetic enamel	11%	9%
Refrigerator laboratory	40, porcelain enamel	18%	14%
Woodworking	40, synthetic enamel	27%	8%
Heavy machine shop	40, synthetic enamel	28%	16%
Coreroom	90, porcelain enamel	38%	23%
Welding shop	40, synthetic enamel	44%	36%
Foundry	40, synthetic enamel	56%	49%

*12-month values. All others are 25-month depreciation.

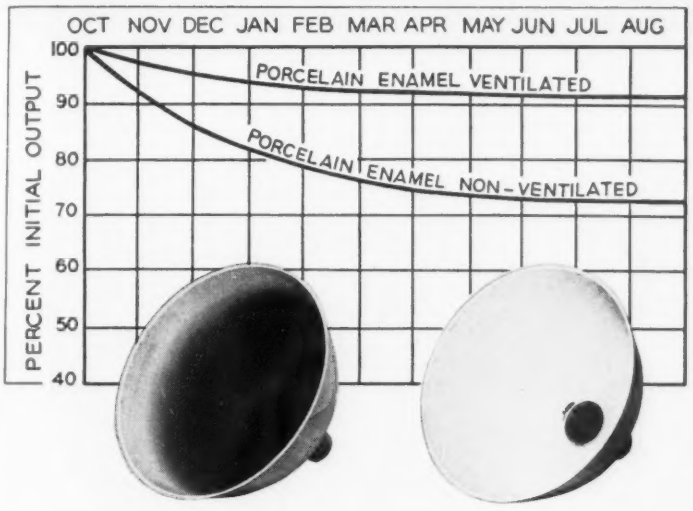


Fig. 3—Chart of welding area test results shows that light output stays higher in fixtures ventilated to reduce dirt build-up. Over the same period, light efficiency dropped 46 per cent in nonventilated high-bay fixture at left and only 5 per cent in ventilated fixture shown at right

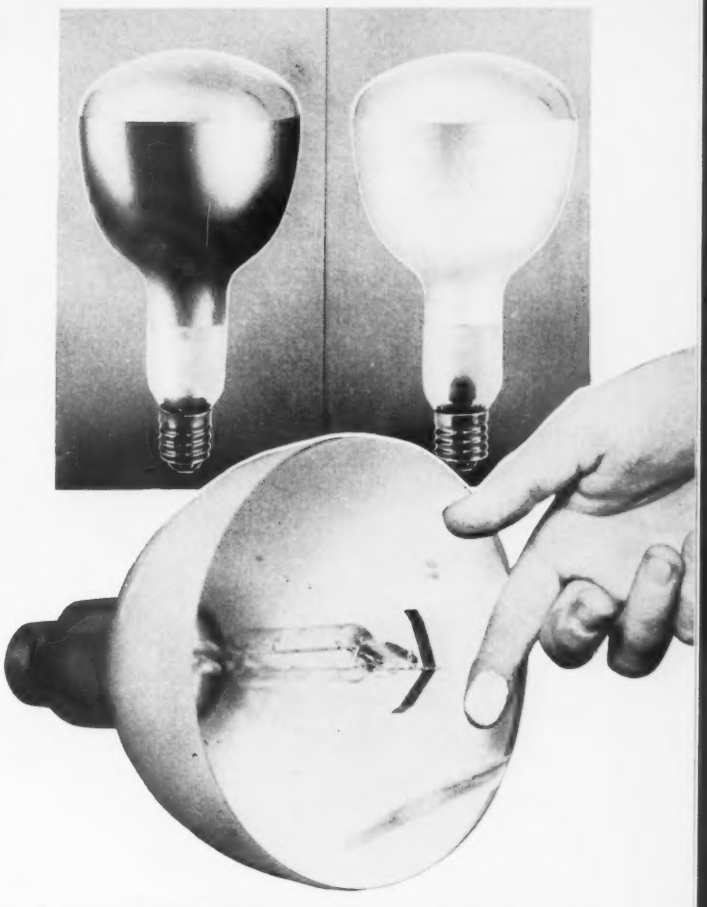


Fig. 4 — Dust-tight reflector lamps. At left is the 500-w or 750-w, R-52 incandescent or the H400-R1 mercury. The H400-RC1 color improved mercury is at right. Phosphor shown on finger tip forms an inner reflective coating

dirt alone can run as high as 60 per cent. Figs. 1 and 2 and Table I offer the evidence for specific industrial operations and types of equipment. Note the advantages, as shown in Fig. 3, for ventilated fixtures—those with openings on the top for upward light.

Actual experience in losses will depend upon the volume and type of dirt in a given plant and the particular lighting equipment used.

For instance, it is obvious that unventilated fixtures will collect dirt more readily than those with open top design. Likewise, dirt on a reflecting surface can be minimized if the reflector is sealed from the air, i.e., with a dust-tight reflector or a reflector lamp. A lamp of this type has its reflector sealed inside (Fig. 4). Thus each time a lamp is replaced a new reflector comes into service. The construction of the color-improved mercury lamp provides an analogous feature. The phosphor on the inner surface of the bulb serves as a reflector. It reflects two-thirds of the light downward; thus it is often called a semireflector lamp. Obviously, where the reflector type lamps are used, less light is lost due to dirt than is the case where standard type lamps are employed.

Because fixture finishes vary in dirt resistance, it is an advantage to check actual plant experience against different types of reflectors. A study should indicate the choice that offers the best practical service for a given policy of cleaning maintenance. Wherever exposed reflector equipment is used, proper cleaning techniques and cleaning programs are essential to obtain maximum return

Hints for the Cleaning Program

Lamps, especially fluorescent types, are more easily washed on the floor, but can be cleaned at the fixture with a pair of sponges —one for washing, the other for rinsing.

Safety is served by turning off circuits. If this retards operations, insulating tape can be used to cover sockets, or dummy bases can be inserted in them.

Blowers can often be used for removing heavy deposits of dirt. If this is not practical, brushing may suffice for the top dirt layers and washing with detergent can remove the rest.

Aluminum fixtures, when washed by even mildly alkaline or acid solutions, may discolor or show chalking of the oxide surfaces. Wiping, followed by polishing with a liquid or wax paste, is recommended.

Porcelain equipment and glass are cleaned readily by detergents or automobile and glass cleaners. The same is true for synthetic enamel finishes.

Plastics, which may be used in foundry office fixtures, are a special case due to the possibility of dust accumulation caused by a static charge in the fixture. Periodic cleaning with a detergent usually gives satisfactory relief from static dirt collection. Or distaticizers can be used. Plastic should never be wiped dry after cleaning.

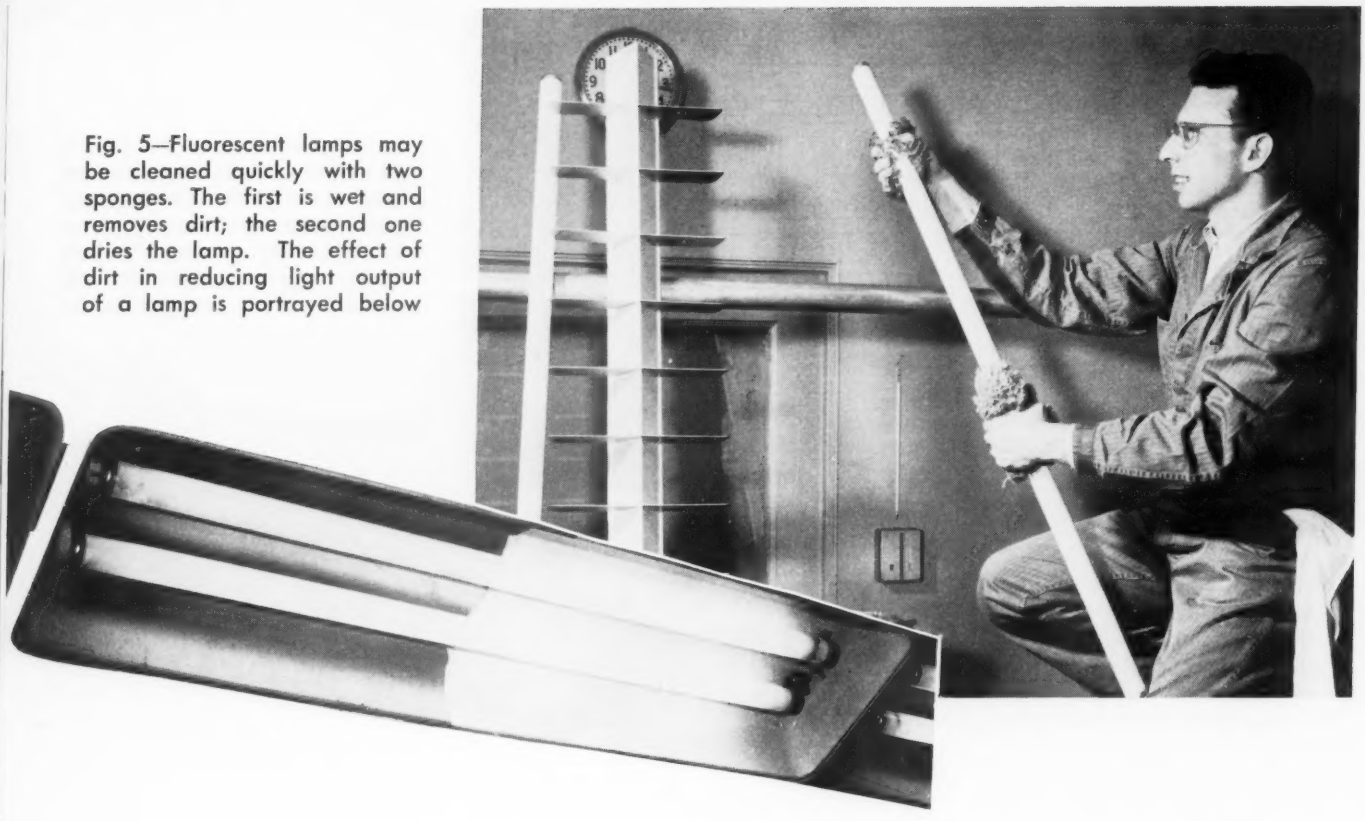


Fig. 5—Fluorescent lamps may be cleaned quickly with two sponges. The first is wet and removes dirt; the second one dries the lamp. The effect of dirt in reducing light output of a lamp is portrayed below

from the investment which is made in lighting.

Dirt on Room Surfaces—While dirt on lighting equipment is one of the major causes of light loss, dirt on room surfaces may also cause serious depreciation. Certainly, the ease of seeing is impaired when dirt collection on surfaces reduces reflected light. Some regard for periodic cleaning of walls and ceilings is advisable in every industrial area. The seemingly impossible job of better plant housekeeping is going forward every year as inherently dirty industries strive for improved health, safety and increased production. Cleaner plants generally have lower turnover of personnel.

Lamp Depreciation—As a lamp burns, its light output decreases until end of life. This decrease, called lumen depreciation, is a factor to be kept in mind in all maintenance plans. While this depreciation is reduced regularly by technical improvement in lamps, the maintenance engineer will find best results in this phase of his work with a program of group relamping. This will be discussed more fully later in this article.

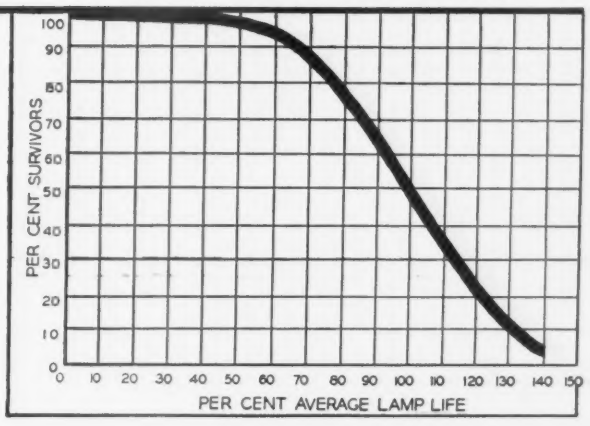
At this point lamp lumen depreciation *emphasizes* the importance of attacking losses caused by dirt. Since there is an inescapable lowering of output as a fresh lamp in a clean reflector ages, good policy seeks to minimize loss from dirt accumulations. Cleaning the lamp and reflector regularly not only lowers losses, but it checks distortion of the purpose of the lighting system—that is, of providing the seeing process with illumination that fully facilitates operations. Dirt drains off efficiency, not only of the lighting system, but of the whole plant operation when maintenance is neglected.

A Cleaning Program—Let us consider typical small to medium foundry conditions in trying to develop some sort of systematic cleaning. We might observe at the outset that in the textile industry dirt accumulation in some departments used to be so heavy that lighting equipment had to be wiped off at the end of each day or oftener. The foundry industry is not alone in its daily battle with dirt, and so far it hasn't progressed as far towards cleaner operations as has the textile industry. But things are happening.

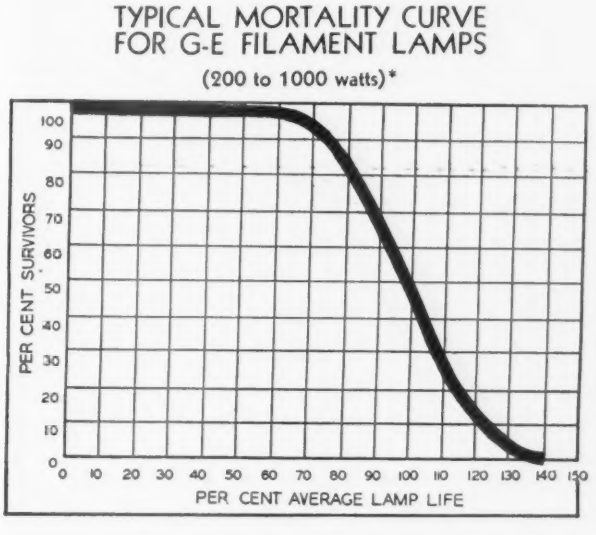
Foundries are concerned with the problem of noise and dust as health hazards. New plant design and modernization of old foundries are making progress. Increasing labor costs are persuading managements to greater efforts to make existing facilities more effective. In line with these indicators of change, lighting maintenance is winning more thoughtful attention.

To make a start, certain goals should be set in terms of footcandle levels and avoidance of glare. Next we might see where the lighting system may benefit by replacing existing lamps in open reflectors with reflector type lamps, either filament or mercury. Since these lamps are most resistant to dirt accumulations we can simplify cleaning and reduce light losses wherever we can use them. Whatever the type of lighting system used, either at low or high mounting, the light emitting surfaces can be cleaned during plant shutdowns, or at a minimum, twice a year. The local or supplementary lighting units, which are often in easy reach probably should be wiped off once a week or even once a day. The point to be observed is that cleaning should be undertaken regularly. The advantages are striking.

Group Relamping



Figs. 6 & 7—Typical mortality curves for fluorescent and big filament lamps under laboratory conditions. High voltage, vibration, moisture or other conditions could change these curves



When a lamp burns out in a foundry, it may be inconvenient to replace it immediately. If some light is available from other sources, it may seem expedient to hold up replacement for a while. A single outage may not arouse any anxiety, and as long as operations go on uninterrupted, little notice may be taken of it. After all, the area may be so dusty and soot-covered that effect of the burnout is negligible. The cost of bringing in a maintenance man, with perhaps a loss of 15 to 30 minutes' production, looms large against the effect of a single outage.

If an accident occurs, however, it may be hard to justify such reasoning. It need not be an accident of much severity to personnel. If it damages equipment, or material, stopping production for a few hours, or delaying deliveries even a few days, it may impose a subtantially larger cost than a lamp replacement. If the trouble is more severe, then, of course, the comparison strongly emphasizes a better plan for replacing burnouts.

There is a better method which is finding much favor in industry.

Instead of "spot replacement" of each burnout, this method utilizes mass replacement and is known as "group relamping." The merit of the latter practice is its economy and convenience. The labor costs of spot replacement are relatively much higher, and it may also involve additional costs in shutdown time. In general, the labor costs saved by group relamping more than pay for the value of the lamps replaced before burnout. Besides this economy there are others with, perhaps, larger significance, such as more light, a minimum of work interruptions on account of lighting, and often less expense for maintenace on operating equipment.

Group relamping is a system of plant housekeeping that brings periodic attention to other phases of maintenance. A program of this character can be applied to any of lamps, but particularly to filament and fluorescent sources. Mercury lamps are often group-relamped, but this is not so widely practiced because lamp costs are a high proportion of the total cost of replacement. However, for those mercury lamps which are often located in hard-to-reach locations, group replacement has special advantages. From many points of view, therefore, group relamping has attractions of economy and efficiency for every industry.

Foundries should consider carefully some of the major advantages of group relamping with special reference to their own problems.

Here's How It Saves—First, there is the strong possibility of net savings through reduced labor costs. Because it eliminates travel time and setup time of spot replacement, the labor cost per lamp with group relamping seldom exceeds 20 cents a lamp (even for fluorescent types) and generally runs from 10 to 20 per cent of spot replacement. The higher the labor cost the greater the savings of group relamping. Higher labor costs often make it more economical to group relamp at shorter intervals.

Next, there is the advantage of more light delivered. As lamps burn they depreciate in light output. Higher values will be realized by relamping before lamps reach the lower output near end of life. Better seeing conditions can be provided, and the lighting equipment can perform more nearly the function for which it was designed.

Third, there is the greater freedom from surprise interruptions in the work. Group relamping done at shutdown time insures greater operating

Fig. 8—Changers for replacing lamps are used for mounting heights to 25 ft or more, depending upon skill and strength of maintenance men

continuity. All of these savings are worth-while.

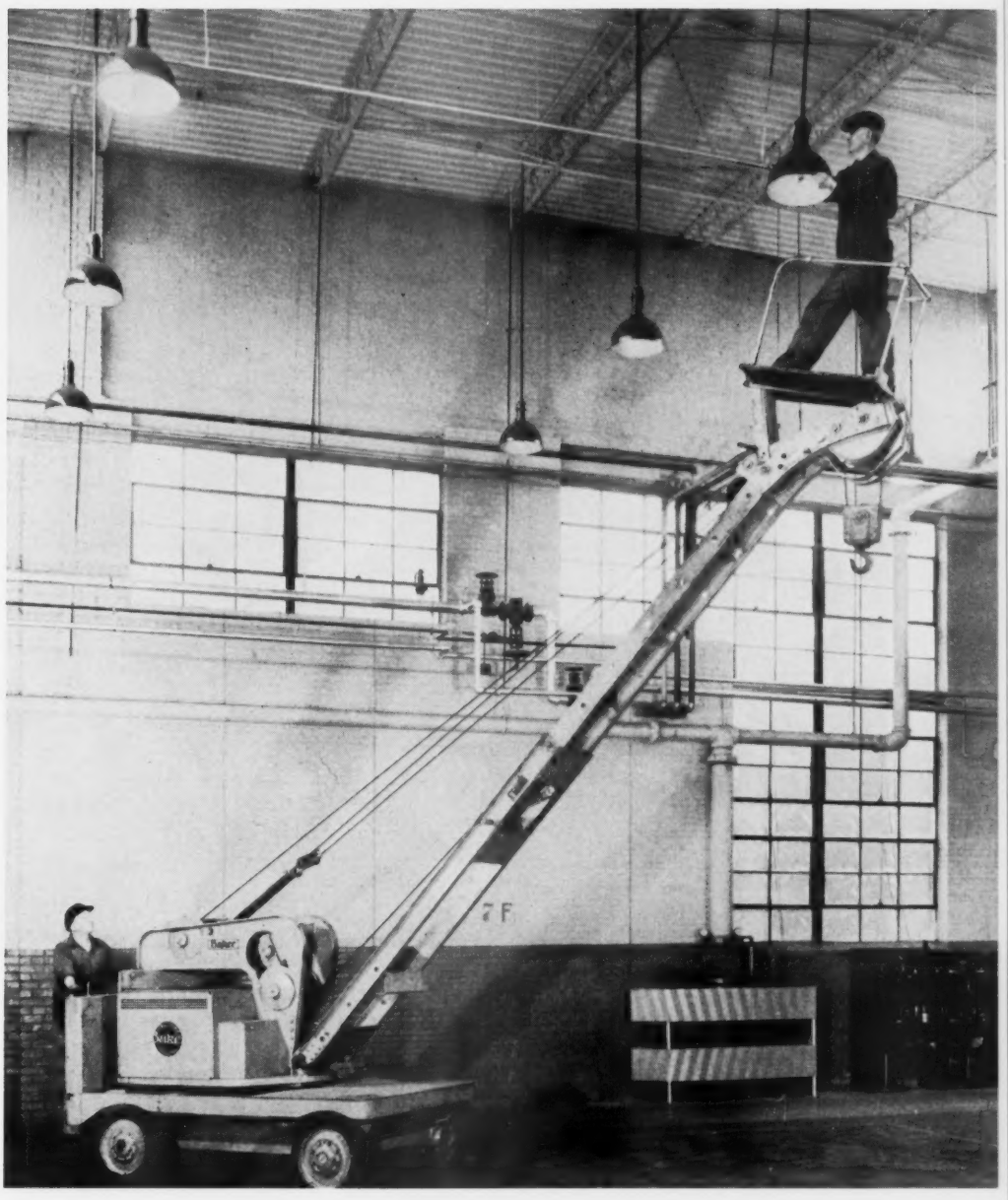
A group relamping program can be planned with reference to the mortality curves of the lamps used in a specific system. Thus, the mortality curves for filament and fluorescent lamps (Figs. 6 and 7) indicate the basis for replacement intervals. The intervals that correspond most conveniently with scheduled shutdowns in a given plant are likely to be the ones to choose.

The interval chosen should be for a point between 50 and 80 per cent average life for fluorescent lamps (3 to 20 per cent burnouts) and between 65 and 85 per cent for filament lamps (4 to 20 per cent burnouts.) (The chart illustrations apply for both types.)

Table II shows how many weeks of lighting service one can expect from the principal types of incandescent or fluorescent lamps under varying hours of use. To figure the approximate time interval at which lamps would be replaced as a group, multiply the weeks of service by 0.8 if re-

Fig. 9—Scaffolds offer a firm platform from which a man can work and stack his materials. Scaffolds must be mobile, light, sturdy, adjustable and easy to assemble and disassemble

Fig. 10 — Relamping and other maintenance may be done quickly and easily from an elevating platform mounted on mobile truck. Worker on platform can raise or lower it, and in some models, truck can be driven from platform



lamping at 80 per cent life, or 0.7 if at 70 per cent life.

While foundries tend to use fewer fluorescent lamps than other industries, it is worth noting that in group relamping programs for this source, where lamps are removed at 80 per cent of life, 20 per cent of the best lamps are often set aside for spares to be used where spot replacement must be made. In some cases lamps are group replaced at shorter intervals when there are few burnouts. Thus, these burnouts can sometimes be left until group relamping is done since they are too few to make a substantial reduction in safety.

TABLE II—Lamp Life in Weeks of Service

Hours Burned Per Week	Type of Service	Weeks of Service — Incandescent Lamp (1000-hr Life)	Weeks of Service — Fluorescent Lamp* (7500-hr Life)
25	School	40	300
50	Single shift—5 days	20	150
80	Double shift—5 days	12	94
120	Three shifts—5 days	8	63

*Fluorescent life ratings are based on 3 burning hours per operation start. If lamps are burned 6 hours per start, add 25% to rated life; if burned 12 hours per start add 60% to rated life.

Lamp Replacement Costs—The cost of lamp replacement is made up of the cost of the lamp and the cost of labor required to replace it. When the sum of these costs is reduced, of course, the total annual cost of operating the lighting system is reduced; you get more footcandles per dollar. It is difficult to assess the exact over-all cost reduction without having all the other facts about the installation. We consider only lamp replacement costs here, but it should be kept in mind that economical lamp replacement also means better over-all lighting economics.

With spot replacement, the total replacement cost per lamp is equal to the cost of the lamp plus the labor cost of replacement. Group-relamping cost, to compare with this, is equal to the

Fig. 11—Maintenance cars which operate along cables mounted parallel to rows of lighting fixtures are effective maintenance devices

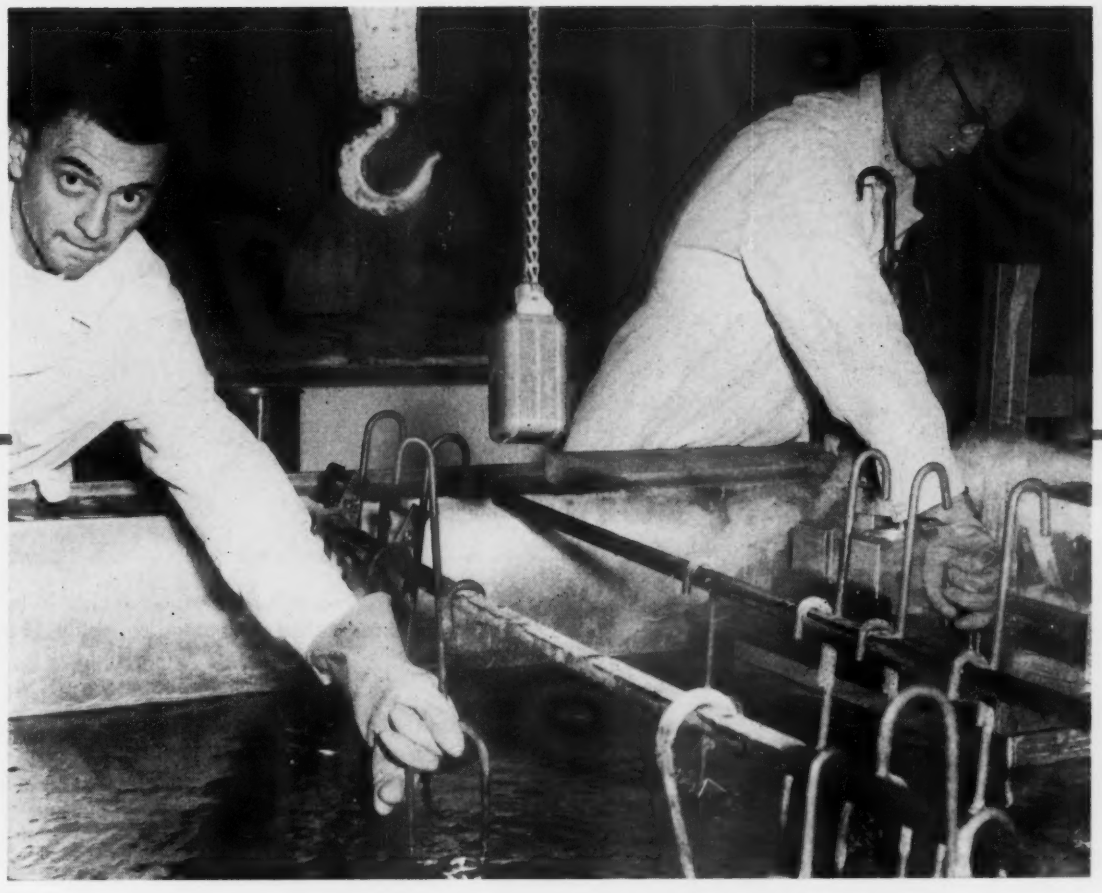
lamp cost plus group-relamping labor cost plus the cost of any interim spot replacement, divided by the group-relamping interval to put both systems on an equal time basis.

Equipment for Group Replacement—Group relamping is a mass-production operation; for highest efficiency it requires trained personnel and tools and equipment designed for high-volume work. As an example, take the case of continuous rows of fluorescent fixtures often used in industry. (Any system using many fixtures and lamps would present similar problems.) To use an ordinary stepladder for lamp replacement would be wasteful of effort; a sectional scaffold that could be rolled down the row would eliminate the need for climbing up and down each time a lamp is changed. The maintenance man who remains on the floor can keep the man on the scaffold supplied with new lamps, and he can take down the old ones. Greater efficiency is achieved if such equipment is designed to pass over obstructions such as desks, showcases, or machines.

Filament lamps at low to moderate mounting heights can be replaced from the floor with a lamp-changing device. Modified or specially-built electric lift trucks are also suitable up to about 25 feet. At least one manufacturer now produces a lift truck especially designed for lighting maintenance operations. A number of manufacturers produce equipment that is suitable for maintaining low-mounted filament and fluorescent fixtures; only a survey of the individual installation will tell which is best.

For high-mounted fluorescent or filament equipment in industrial plants, a traveling crane often provides easy accessibility for changing lamps and cleaning fixtures. Sectional or telescoping scaffolds are another choice for reaching high-mounted units. To provide one of the safest and easiest-to-maintain systems, the fixtures can be mounted on disconnecting hangers that break the electric circuit when the fixtures are lowered to the floor level for maintenance. Again, only a survey of individual needs will determine the best choice for each establishment.

A few of the many types of lighting maintenance equipment are shown here to give some idea of the range of tools that are available. Many of these units are useful in other operations, such as cleaning, painting, construction, and other maintenance activities. Equipment should be purchased with an eye to its versatility in other operations between lighting maintenance intervals.



Mercury in steel pattern dies is chilled to about −90°F in refrigerated acetone baths. Solidified patterns can be handled for about 60 seconds

New Plant Produces

Mercury Investment Castings

Mercury investment casting technique is making possible the use of steel aircraft castings in place of forgings. Frozen mercury patterns are used to make ceramic molds into which castings are poured

By THOMAS A. DICKINSON

STEEL castings suitable for many purposes once served by forgings now are being produced for the western aircraft industry in a foundry recently established by Mercast Mfg. Corp. at La Verne, Calif. In addition, the plant is turning out top quality aluminum castings too large or too complex to be fabricated economically by the lost-wax process. And as the result of a research-development project now under way, it may soon cast commercially-practical parts containing titanium.

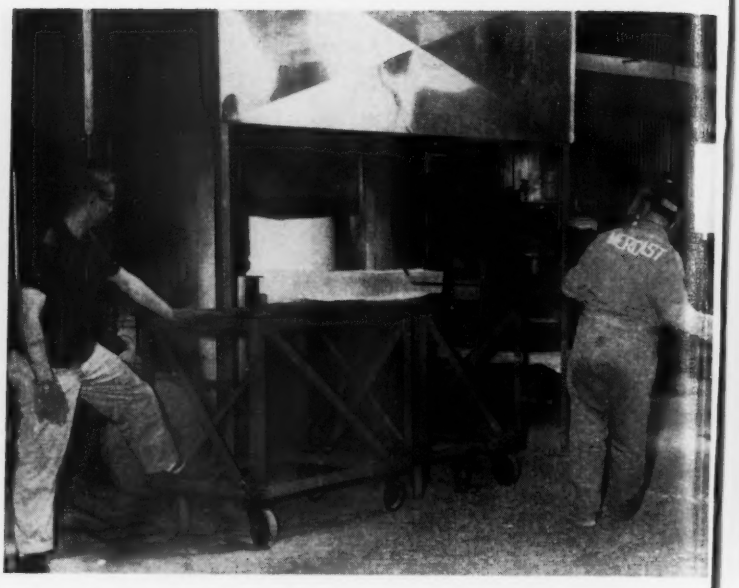
Mercast is the originator of an investment casting technique which uses frozen mercury patterns to make ceramic molds into which virtually all castable alloys can be poured—even where vibrational, centrifugal, and vacuum processing techniques are required.

Due to cost considerations, the process is not competitive with other foundry methods where the latter are capable of yielding castings of adequate quality. However, it is saving money and reducing the number of compromises that must be made in the design of airframe and engine components by permitting the use of castings in place of forgings.

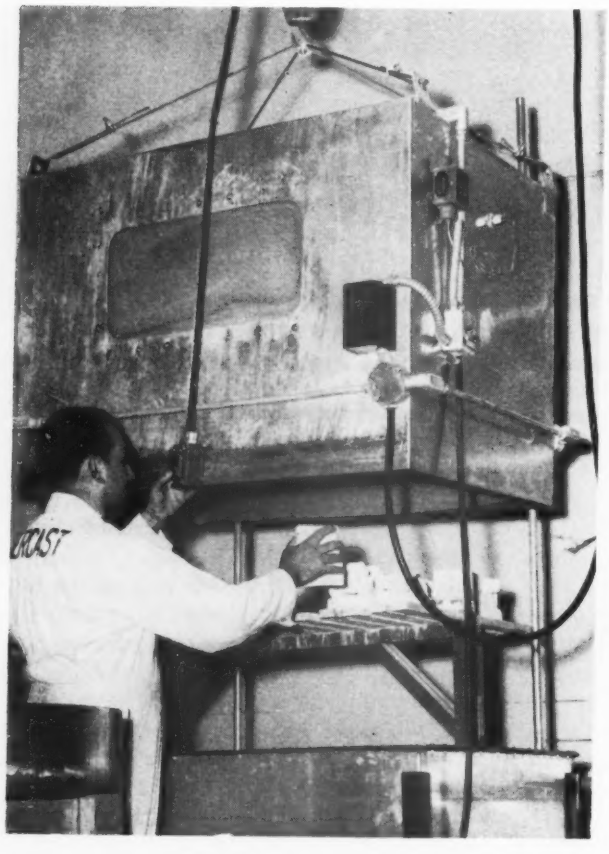
Work is done by a crew of 83 employees in 17,000 sq ft of floor space with facilities that can be used to cast up to 18,000 lb of steel and 3000 lb of aluminum daily.

Make Own Dies—Steel and aluminum dies for the fabrication of mercury patterns are made in

Ceramic materials and organic binder are dispersed mechanically in a refrigerant solution



Red-hot flask containing ceramic molds is taken from furnace. Molds are heated to about 1850°F



Green ceramic mold shells are inverted to remove mercury pattern materials. Elevator-type oven unit above provides heat to speed recovery

the foundry's complete machine shop. With such tools, exceedingly complex patterns can be made as a series of relatively simple mercury castings because the latter—when solidified by sub-zero temperatures—can be "booked" or welded simply by pressing them together. Dies containing mercury poured at room temperature are chilled by immersion in special tanks containing acetone which is refrigerated to an average temperature of about −90°F.

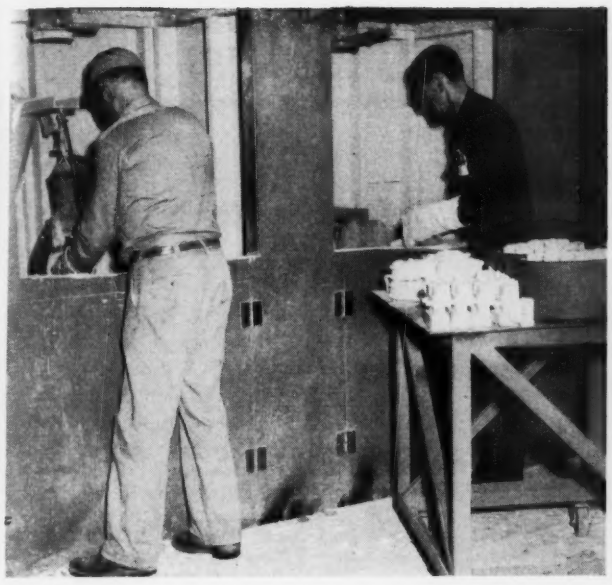
Mercury patterns or pattern components solidified at the latter temperatures physically resemble cast lead and can be handled or hand-worked outside of the acetone baths for as long as 60 seconds at a time without absorbing enough heat to flow or become distorted.

Molding Technique—The first step in making a mold involves use of a ceramic slip, which is prepared by mechanically dispersing an organic resinous binder and inorganic mullites and zirconites in a refrigerant solution known as Freon 22. Each pattern is dipped in the latter slurry several times, and, because the refrigerant is capable of vaporizing rapidly at relatively low temperature, a green ceramic shell is produced on the pattern.

Most mercury in the mold shells is recovered for further use simply by inverting the shells and allowing the metal to flow as it absorbs normal atmospheric heat. A low-temperature oven permits the removal of remaining mercury by vaporization.

Green mold shells, bonded by organic resins, are next furnace-heated to about 1850°F to burn out the organic materials, leaving behind shells that are completely inorganic. These inorganic shells, when removed from the furnace, are stored until required for use in subsequent pouring operations.

Prior to the pouring of metal, the shells are inspected thoroughly for imperfections and dirt particles. Then they are placed in metal flasks



Ceramic molds are broken away from castings with compressed air and mechanical facilities

Inspector in the new California plant checks dimensional accuracy of investment castings

where they are reinforced by backing them up with loose sand.

Each mold is preheated before metal is poured to eliminate any moisture it may have collected while it was being processed for casting; to maintain metal fluidity, especially in thin sections, and to control the solidification pattern by retarding metal cooling.

Melting and Pouring Techniques—Nonferrous alloys are melted in electric resistance and gas-fired furnaces, while ferrous alloys are melted in three high-frequency induction furnaces. Melt quantities range from 100 to 1000 lb per furnace at this writing.

Gravity mold pouring techniques generally are employed for large or relatively simple castings. In the production of thin-walled nonferrous castings, a perpendicular centrifugal machine is used to obtain slinging action which will force metal into mold cavities otherwise difficult to fill.

Improved vacuum equipment also has been developed by the company for casting both ferrous and nonferrous metals. The permeable structure of a mold permits use of a high-vacuum pump in forcing the metal into the cavities. This practice eliminates the need for excessive preheat temperatures in the production of thin-walled or intricate castings requiring very fine grain structures.

Vibration casting is being done where controlled grain structures and other special metallurgical properties are required. Frequencies and amplitudes employed depend on the alloys being cast as well as property specifications in each instance.

Produce Close-Tolerance Parts—Aluminum castings thus far produced in the La Verne plant weigh from 2 oz to 10 lb and have cast tolerances of ± 0.008 in. over-all in sections up to 4 in. Steel castings weigh from 4 oz to 85 lb and have as-cast tolerances ranging from ± 0.010 in. over-all in sections up to 4 in. and ± 0.040 in. in sections to 24 in. Surface finishes of 60 rms are consistently obtained in nonferrous alloys; 125 rms in ferrous alloys.

The Mercast process is said to have been successful in producing stainless steel valve bodies for high temperature and corrosion resistant applications in aircraft and missiles. In a number of instances, it has saved money and improved product quality by making possible the casting of one component to serve the purpose of several parts that had to be assembled by welding, brazing, or other means.

Components analogous to the latter steel castings might have been fabricated as two or more forgings in each instance. But their cost would have been relatively high, due to the need for more steel tooling as well as additional fabrication and assembly operations. Also, because of their directional grain orientation, they would have lacked the high fatigue strength of investment castings.

The mercury investment casting process also is being used to produce some parts such as locking latches, which once were made by machining methods to obtain high physical properties and close tolerances.

Cost allowances in the aircraft industry are such that it has been feasible in some instances to use mercury patterns in casting as few as two identical parts, but quality requirements generally cannot justify the tooling expenditures that this involved. Therefore, the mercury investment casting process must be regarded as a moderately-high production method for most purposes.

However, according to Jack Warshaur, executive vice president and general manager of the La Verne plant, Mercast is currently engaged in the development of inexpensive temporary dies which should increase greatly the use of mercury patterns where minimum quantities of castings are needed. In this connection, he adds that very favorable test results now are being obtained with dies made from various soft metals and plated with nickel or chrome to prevent their amalgamation with mercury.

Questions and Answers

Encounters difficulty from shrinkage under risers which only can be eliminated by designing them to function properly . . . Life of thermocouple tips lowered by high temperature . . . Mushrooming of sprue indicates gas absorption . . . Hits trouble jackpot

Has Shrinkage Under Risers

QUESTION We are making some clutch pulleys with approximately 1¼-in. metal sections which are shrinking by the risers. Drillings sent to a commercial laboratory show 3.52 per cent TC, 3.29 per cent GC, 0.23 per cent CC, 2.46 per cent Si, 0.135 per cent S, 0.58 per cent Mn, and 0.47 per cent P. What do you think of the effect of the low CC on shrink? Perhaps it is a Si shrink. We are making mainly light castings with ¼ and ⅛-in. sections and maintain the Si around 2.40 per cent. If a customer wants more strength we simply add 10 per cent by volume of molten steel from an electric furnace we use for production of small steel castings. Is there any literature available on what metal compositions will produce the least shrinkage for given metal sections?

ANSWER Your problem of shrinks, presumably under the risers, indicates that the risers are not functioning properly, and that is a matter of design rather than of metal composition. The locations of the risers are such that they freeze or solidify before the casting, and do not supply any feed metal. This situation must be corrected if you expect to obtain solid castings, since the present composition in the section thickness mentioned will have a low internal shrinkage because of its tendency toward complete graphitization—and that is indicated in the analysis given.

Since you do not mention the method of gating and risering, we cannot make any suggestions except to say that if you are going to use risers, see that they are located as closely as possible to the section to be fed, and then see that they contain hot metal. With the particular composition, we would not be surprised to find solid castings without the risers. However, with a 1¼-in. section we believe it is preferable to use a lower silicon iron—about 2 per cent Si of that element. In your case that could be accomplished by the addition of 20 per cent molten steel.

You could attain the same results by counteracting the effect of the high silicon of the present mixture by addition of chromium in the form of ferrochromium or other chromium-bearing material. One part of chromium will counter the effect of 1½ parts silicon. Again it must be emphasized that changing the composition will not eliminate the shrinkage trouble.

Your last question is somewhat odd, and we doubt that is what you want to know. A direct answer is that by proper gating and risering of a casting, any composition will provide a solid casting, but not necessarily a casting with mechanical properties to fit the application. In other words, while it is possible to produce a sound 2-in. section with an iron containing 2.50 per cent Si and 3.50 per cent TC, it would have an extremely coarse structure, be quite low in tensile strength, low in hardness and not at all suitable for a machine tool casting.

In general, specifications relating to gray iron are based on tensile strength as listed by ASTM designation A-48, which includes seven classes ranging from 20,000 to 60,000 psi tensile strength as determined on test bars correlated to casting section size. Usually the most suitable properties in gray iron castings are obtained with a pearlitic structure free from ferrite and cementite. The foundryman endeavors to obtain such a structure by adjusting the composition in relation to cooling rate since he cannot control the latter to any great degree.

Fast cooling of thin sections tends to produce cementitic or white fracture structures, while slow cooling of heavy sections results in graphite and ferrite structures. Since silicon is a potent graphitizer, the foundryman employs that element to offset the effects of cooling rate. In case of thin sections and fast cooling, the silicon is increased, and with heavy sections and slow cooling the silicon is decreased. Further control is exercised by use of other alloys or agents which in some degree promote graphitization or carbide stabilization.

Possibly a study of "Composition and Properties of Gray Iron" and "Correlation of Properties of Gray Irons" by R. G. McElwee and Richard Schneidewind in *Transactions* of the American Foundrymen's Society, Vol. 58, 1950, will provide some of the information you are seeking.

Pouring Temperature Is High

QUESTION We are making tin-bronze grave markers and find we have to heat the metal to 2400°F to insure running in these thin-section castings. As a result we are having very poor life on the enclosed-type thermocouple tips used for temperature determinations, and the sales representatives explain that the trouble is due to the high temperature. Do you know of any product or process we could use to give us an accurate reading on tin bronze at 2400°F?

ANSWER While it is true that life expectancy of thermocouples is lower at high temperature than at the usual temperature range for bronze, possibly it might be increased by attention to some details. It may be that the couples are immersed in the molten metal much longer than necessary, or the tips are plunged in deeper than the 3 in. usually recommended. Again the temperature may be taken when observation would indicate that it is considerably beyond the desired point. Another possibility is careless addition of phosphor copper. As phosphorus increases, the molten bronze becomes more corrosive to the tips with consequent reduction in life.

Although thin sections require higher pouring temperatures than heavier ones, your mention of 2400° seems to be somewhat steep. We suggest that you examine the gating systems employed from the viewpoint of improving the rate of metal flow into the casting. Flow may be increased by enlarging the present gates, or preferably by increasing the number of entrances. With a freer flow of metal into the mold cavity, lower temperatures can be employed.

As to other means of ascertaining temperatures, your attention is directed to optical and radiation-type pyrometers which are available from a number of manufacturers.

Trouble Due To Gassy Metal

QUESTION We are sending you a riser taken from one of our brass castings which shows a condition encountered from time to time. The heat was composed of an all-scrap mixture heated to 2100°F, and transferred to a pouring ladle where 2 per cent by weight of phosphor-copper was added, one-half at the bottom of the ladle and the remainder at the top after skimming. The casting was poured at 1950°. The sample sent to you is rather an extreme example of what happens occasionally when the brass seems at first to shrink in a normal fashion, and then a few minutes later begins to bleed back. A white residue usually accompanies this action and the casting is very porous.

ANSWER While the sample submitted tells part of the story, it would have been helpful to know the nominal composition of the metal and how it was melted. The fact that the metal in the riser started to shrink and then backed up proves that the troublesome gas was in solution in the metal until released all at once as the metal cooled. This fact is confirmed by the uniform distribution of small holes throughout the sample. We can be sure that the holes are not due to anything wrong with the cores or molding sand or to air which might have been sucked in with the metal stream. The trouble is in the metal itself.

If by "all-scrap mixture" is meant miscellaneous scrap from unknown sources, it is suggested that the use of such scrap is hazardous, a practice now seldom followed. In the long run it is better to pay a little more for a reliable grade of composition ingot. If the metal was good before melting, the melting and pouring practice should be examined closely. Water vapor is the most common cause of gas porosity. If the ladle was newly lined, possibly it was not perfectly dry. A long pouring stream on a hot, humid day will cause trouble although not usually as severe as that shown in the sample.

Sometimes furnace linings or patches which are supposed to be dry contain enough moisture to gas the metal. Damp charcoal is another thing to watch out for. If the metal is melted in any type of fuel-fired furnace, make sure that the flame is slightly oxidizing. If melted in an electric furnace, the metal must be dry and free from oil and cutting compound.

We wonder if you really mean that 2 per cent of phosphor-copper was used. That would be 2 lb per 100 against the usual dose of 2 oz for the same amount of metal. Unless the metal is a phosphor bronze, which we doubt, we hesitate to guess what might result from such a massive overdose of phosphorus.

Producing Aluminum Castings

QUESTION We operate a foundry in the Belgian Congo, and are contemplating the addition of an aluminum casting department. We would like to have some information. We have tried making some castings, but found that they were full of holes internally as well as externally. Could that be due to gas, and how can the trouble be eliminated? We have available a silica sand (Congo river) with an AFS fineness of 68, and would like information on compounding a synthetic sand for use with aluminum castings.

ANSWER From the description of your venture into aluminum castings production, it appears that you "hit the jackpot" in the trouble department. Undoubtedly the internal holes are the result of gases absorbed during melting, perhaps in combination with air inspirated into the metal stream during pouring. The external holes may result from high moisture in the sand, hard ramming or a combination of the two.

Molten aluminum alloys tend to absorb gases of combustion, particularly hydrogen, and that proclivity increases as the temperature rises as well as with time of exposure. The foundryman should see, therefore, that melting is conducted as rapidly as possible and that the temperature reached by the alloy is just sufficiently above the desired pouring range to permit skimming and carrying to the mold side. Additionally, as soon as the temperature is reached, the pot or crucible should be pulled from the furnace for pouring—not allowed to set and stew in the furnace. Also the raw materials to be melted should be clean, dry and free from oil, etc. Furnace atmosphere should be slightly oxidizing.

Under moist or humid atmospheric conditions difficulty often is encountered in obtaining gas-free metal. In such cases the trouble can be overcome by use of gaseous or solid fluxing or degasifying agents. Such gases include chlorine and nitrogen while the solid fluxes are compounds which generate chlorine in contact with the molten metal. These materials must be moisture-free to function properly.

Stirring and skimming tools must be kept dry, else water vapor, and hence hydrogen, will be introduced into the molten metal. Stirring should be gentle, with a pumping action from the bottom of the crucible or pot so as not to disturb the surface any more than necessary. Skimming likewise should be done smoothly at the surface and just sufficient to remove the visible dross and extraneous material. Violent stirring and skimming only create more aluminum oxide and waste metal.

In pouring, the lip of the crucible or pouring ladle should be held as closely to the sprue opening as possible. High or long streams permit entrainment of air and moisture. Pouring should be s t e a d y and smooth; any wavering or wobbling will tend to break the oxide envelope surrounding the metal stream. The oxide then will be carried into the mold to form inclusions. Sprues or entrance channels for the metal should not be so large as to permit turbulence, and the gating system should permit the molten metal to be introduced into the mold cavity smoothly. Preferably locate runners in the drag and gates in the cope.

Choice of molding sand generally depends on desired smoothness of casting surface. For extremely smooth surfaces, pick a sand with the finest grain size which will not result in surface blows because of low permeability. Where surface smoothness is not so critical, coarser sands should be used.

Moisture content of the molding sands should be as low as possible in relation to the workability of the sand; the amount will depend on the type of bond. Relatively large amounts of clay—around 10 per cent—usually are required to provide the necessary bond, and to develop plasticity about 6 per cent water is needed. Bentonite has greater bonding power than clay so less is required—about half that for clay. Likewise,

with use of a lower amount of bond, less water (about 4 per cent) is required. When using low bonding material and low moisture, control of the latter is more critical than when higher bond and water are employed. In many cases mixtures of clay and bentonite are used to take advantage of the characteristics of both.

From this distance, it is not easy to answer your last question since we are not familiar with what sand is available. The sand you mention, while satisfactory for cores, hardly is suitable for molds because it will leave a rough surface even on fairly heavy castings. If surface appearance is unimportant, however, a moldable sand might be developed by use of about 10 per cent bonding clay or 4 per cent bentonite, and appropriate additions of water as indicated earlier.

Experimentation of course, would be necessary to determine the most suitable amounts of bonding agent and water. Preferably, it would be advisable to blend a mixture of much finer sand—150 grain size or finer—with the coarse sand—perhaps 65 to 70 per cent fine sand with 35 to 30 per cent coarse—to produce a finer average grain size. Another way to obtain a smooth surface on castings would be to use a thin layer of fine-grain facing sand on the pattern, and back it up with the coarse material.

Pit Casting for Water Pipe

QUESTION We operate a foundry in India and would appreciate some information on the following: What is meant by fused soda ash, and is it different from soda ash? At present we are using soda ash which is formed into blocks by the addition of a little sodium silicate and water. In our cupola we are using 3 lb soda ash, 28 lb limestone, 84 lb coke and 560 lb metal. Cupola is 27 in. ID, and the quality of the coke is bad as it contains 10 to 15 per cent ash. We want to start a new foundry for vertical casting of cast iron pipe, flanged as well as bell and spigot type, having a daily capacity of 3 tons. Can you give us some ideas for running such a foundry economically? Please note that labor is cheap and complete mechanization is not necessary.

ANSWER Fused soda ash refers to soda ash or sodium carbonate which has been heated to the melting point, and then poured into the form of small pigs or blocks. It contains 58 per cent Na_2O. The material you are using will contain less Na_2O, the amount depending on how much water and silicate is added as well as on whether the soda ash is in the anhydrous form or contains water of crystallization.

Presumably, the addition of the soda ash in the cupola is to produce a more liquid slag with the high addition of limestone, since its affinity for silica is much greater than for sulphur under the conditions. Apparently, you are not having difficulty with excessive lining burnout, but if you are, we suggest gradual reduction of fluxing agents.

Since detailed description of methods of producing cast iron water pipe by the pit or vertical casting process would require considerable space, we can touch on only a few points. Bell and spigot pipe are made with the bell end down or up in pits deep enough to contain the major portion of the mold except for 3 feet extending above the top of the pit. Length of the pit will vary with the number of molds being handled during the operations of ramming, drying and pouring. Molds are rammed in the vertical position on jolt machines or by use of pneumatic rammers with long extensions which are counterbalanced and supported by a pulley attached to the roof trusses of the foundry.

After ramming, the mold is stripped from the pattern and moved to the drying section of the pit where it is placed over a grating through which heated air and products of combustion are blown. Following the drying operation the molds are lifted from the gratings, moved a short distance and then the cavity is given a coating of liquid blacking. The blacking is dumped from a pail against a disk held in the mold which causes the blacking to spray out against the sides of the cavity, and run to the bottom of the mold. Heat of the mold dries the blacking. In some instances the blacking may be applied before the molds are placed on the drying gratings.

Mold again is lifted and moved to the pouring section where the core is inserted, the flat ring core containing the gates is set in position over the core, which projects above the top of the mold, and then the ring core, about 5 or 6 in. high, which forms the pouring basin is placed in position.

Cores for small-diameter pipe are made on seamless tube arbors while those for large pipe use hollow cast iron arbors. Arbors are wet with clay wash or water, and a layer of hay rope or corrugated paper wound on spirally. The arbor is coated with about 1 in. of loam, and then dried for a short time. Then a thin coat of finish loam is applied, the surface coated with blacking, and the assembly is baked thoroughly to eliminate moisture.

In making the cores the arbor is placed horizontally in trunnions and rotated by hand or machine while the loam is applied by hand or from an overhead hopper, with a narrow slot opening extending the length of the arbor. Striking off is accomplished with a long bar or knife along one side of the trunnion device.

Faces of Bosses Are Not Flat

QUESTION Recently we made a small pattern for producing an aluminum alloy casting to be inserted in a corebox to be used on a blower. On examining the casting the faces of the two bosses which were located in the drag were found to be concave to the extent of about 1/32-in. In a discussion of the defect, some people term it a shrink, but we cannot see how the metal will shrink upward. Our opinion is that with the ingates delivering metal directly into the bosses, gas was pocketed and prevented the metal from feeding down, or the heat caused the sand to expand. We doubt the latter possibility, however, due to the low temperature (690 to 700° C) in pouring. Sand is natural with fairly high silt.

ANSWER Assuming that the pattern was checked carefully to see that the faces of the bosses were practically flat, we agree with your statement that metal does not shrink uphill, and the concavity is caused by something else. While the possibility of the formation of gas pockets beneath the bosses exists, we would expect those accumulations to result in blows rather than in forming a concave surface.

Our opinion is that the sand expanded or was pushed up by heat effect. While you express doubt about the temperature, it should be pointed out that silica undergoes an inversion from the alpha to beta type at about 575° C with a sharp linear expansion. If insufficient cushioning material is available to permit expansion without deformation of the sand face, the face moves outward. Difficulty of this type is encountered principally with sand of uniform grain size.

Possibly the high silt content of the sand filling the voids between the grains may be a factor, particularly if the sand was rammed a little too hard over the bosses—which could occur because of the difference between height of the bosses and that of the remainder of the pattern, especially if the sand happens to be spread thinly over the bosses.

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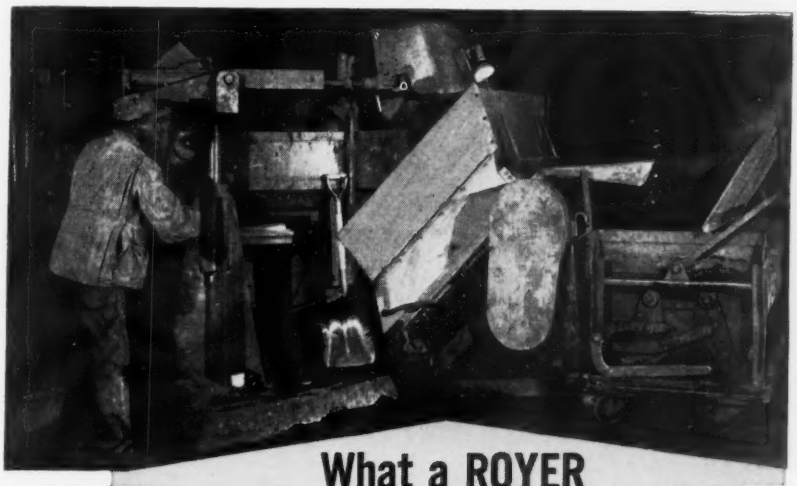

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3. Eliminate all clay balls.
4. Provide a final complete mixing.
5. Double aerate the sand.
6. Speed cooling by fluffing, open discharge stream and open heap.
7. Assure a light, fluffy texture.

A Model NRS in a Massachusetts foundry.

The mulling operation, designed to coat sand grains with certain additives by the mechanical process of kneading, is an essential one for good sand control. However, this action results in pressing and packing the sand grains together and the added bonding materials tends to hold the sand in a dense state. Sand properly prepared for molding should be open and fluffy, to allow for good flowability and the escape of gases. Sand discharged from ANY muller needs to be aerated . . . with a ROYER . . . the only machine large enough to handle the instantaneous discharge from large mullers; the only machine which fluffs and cools as it aerates.

Install a Royer directly under your muller discharge or later in the system, if more convenient. Two models are recommended for this application, depending upon capacities desired—the NRS, 40 to 60 tons per hour or the NYS, 120 to 180 tons per hour. With the addition of a Royer no time is added to the cycle of sand preparation and, for a fraction of a cent per ton, the quality of your sand will be improved many times over. Write for complete details.

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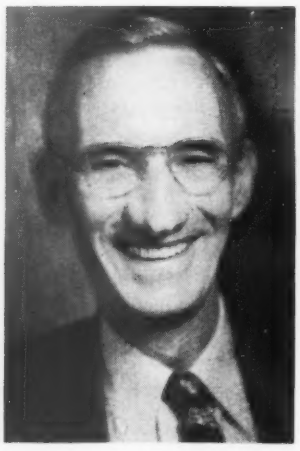
Men of Industry

GORDON A. WILTSE
. . . pres., Parker-Street Co.



H. R. STREET
. . . Parker-Street chairman

A. F. SKOK
. . . Parker-Street secretary

O. JAY MYERS
. . . foundry div. v. pres.

GORDON A. WILTSE was named president, Parker-Street Castings Co., Cleveland, to succeed **H. R. Street,** who has been president for 31 years and is now chairman of the board. Mr. Wiltse, who has been with the company for 27 years, continues as general manager. **A. F. Skok,** recently elected a company director, succeeds Mr. Wiltse as secretary, and continues as purchasing agent.

Gordon E. Keim was elected president-general manager, Philadelphia Bronze & Brass Corp., Philadelphia, a subsidiary of P. R. Mallory & Co., Indianapolis. **W. D. Bryden,** former president and a director of Philadelphia Bronze, has resigned to pursue other interests on the West Coast. Mr. Keim joined the company in 1937, has held production and sales positions and became a director several years ago. Other appointments at Philadelphia Bronze include those of **Harold T. Hunter,** sales manager since January, who was named secretary, and of **Samuel P. Archino,** formerly of Mallory & Co., who was named treasurer.

John P. Bodle, secretary-treasurer, Portland Forge & Foundry Co., Portland, Ind., and **Ronald M. McDowell,** comptroller, Dalton Foundries Inc., Warsaw, Ind., were elected directors of the Fort Wayne Control, and **John G. Sheppard,** comptroller, Dominion Foundries & Steel Ltd., Hamilton, Ont., was named a director of the local control.

Theodore W. Bossert, since 1951 assistant chief metallurgist of the metal manufacturing divisions, Aluminum Co. of America, Pittsburgh, was appointed chief metallurgist, heading the metallurgical division of the operating department. A graduate of Massachusetts Institute of Technology, he joined Alcoa's technical direction bureau in 1923. Later he was transferred to the Research Laboratories. He became chief metallurgist of the fabricating division in 1944.

William B. Ross was elected vice president, Eastern Gas & Fuel Associates, Boston. He will be in charge of its coke plant and blast furnace in Everett, Mass., and its Philadelphia coke plant, and will be responsible for co-ordinating Eastern's coke plant operations, including those of the Connecticut Coke Co., New Haven, Conn. Mr. Ross will continue as president of Philadelphia Coke Co., Philadelphia.

Marlin R. Hemphill, general manager of the Carmet Division, Allegheny Ludlum Steel Corp., Ferndale, Mich., has also been appointed general manager of the Forging & Casting Division there. **T. A. Moormann,** formerly manager of the latter division, died last month. Mr. Hemphill joined Allegheny Ludlum in 1934.

Donald E. Barton was named plant manager, Dahney Foundry & Machine Works, Lynchburg, Va.

O. Jay Myers, until recently technical director, Archer-Daniels-Midland Co.'s Foundry Products Division, Minneapolis, is now vice president in charge of the Foundry Division, Reichhold Chemicals Inc., White Plains, N. Y. A graduate of Princeton University, he later received advanced degrees from Colorado School of Mines. In 1942 he joined Wright Aeronautical Corp., Lockland, O., where he was director of foundry practice, and became associated with ADM in 1945. A former chairman of the Twin City Chapter of the AFS, he was named a national director of the AFS in 1955 and was chairman of the AFS Sand Division for 1955-56.

Arthur J. Burke and **William Hamilton** were named vice presidents, Richardson Scale Co., Clifton, N. J. With the company for 20 years, Mr. Burke was named chief engineer in 1951. Mr. Hamilton joined the company over 25 years ago.

W. S. Sherk was appointed technical director of operations, Electro Metallurgical Co., Niagara Falls, N. Y., division of Union Carbide & Carbon Corp., New York. A graduate of University of Toronto, he joined Electromet in 1922.

Foster C. Bennett recently received the Willard H. Dow Memorial Award for outstanding contributions toward advancement of magnesium die casting technology, specifically for devel-

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MEN OF INDUSTRY

WARNER B. BISHOP JR.
. . . ADM foundry products head

W. C. KREMER
. . . Chicago mgr., ADM

JOSEPH HEKLER
. . . ADM foundry sales, Lansing

JULIAN TERPENNING
. . . ADM service engineer

opment of automatic machine casting processes. Mr. Bennett has been chief of the company's metallurgical laboratory since 1954.

Warner B. Bishop Jr. was named vice president in charge of the Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, succeeding **L. P. Robinson,** retired. Mr. Bishop, who joined the division in 1945, served as export manager, manager of foundry sales, and became an assistant vice president of the company in 1955. Other appointments in the division include **W. C. Kremer, Joseph Hekler** and **Julian Terpenning.** Mr. Kremer, who joined the company in 1941, was appointed Chicago manager, succeeding **J. C. Gore,** retired. Mr. Hekler becomes sales representative in the central Michigan territory with headquarters in Lansing. Mr. Terpenning, technical service engineer, will have headquarters in Lancaster, Pa., replacing Lancaster Foundry Supply Co., previous representative in the area.

Henry Bryk was appointed special assistant to the executive vice president, Alloy Precision Castings Co., Cleveland, where he will be in charge of the Lost Wax Division, and will also handle special development and production problems. A graduate of Columbia University, Mr. Bryk was previously associated with Arwood Precision Casting Co., Brooklyn, N. Y.

Paul A. Dougher, formerly superintendent of engineering, Verona Works, American Steel Foundries, Verona, Pa., was appointed works manager there. A graduate of Notre Dame University, he joined American Steel Foundries in 1935 and previously served as works engineer at several of the company's plants.

Richard L. Lindland, since 1952 vice president and secretary, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., was named president, succeeding **Carl E. Allen,** who has resigned to become president, Federal Reserve Bank of Chicago. Mr. Lindland joined the company in 1942 as secretary, later became a director, and continued as vice president after the firm's acquisition by Textron in April of this year.

Merlin H. Birk was elected administrative vice president, Consolidated Foundries & Mfg. Corp., Chicago. For the last 17 years he was with Waukesha Foundry Co., Waukesha, Wis.

Herbert von Wolff was appointed general sales manager and vice president, Shalco Engineering Corp., Palo Alto, Calif.

Donald L. LaVelle was recently appointed assistant pig and ingot product manager, Kaiser Aluminum & Chemical Sales Inc., Chicago. A graduate of University of Washington, he holds a master's degree from Montana School of Mines. Since 1946 Mr. LaVelle was associated with Federated Metals Division, American

HENRY BRYK
. . . joins Alloy Precision

PAUL A. DOUGHER
. . . becomes works mgr.

RICHARD L. LINDLAND
. . . president, CWC

DONALD L. LaVELLE
. . . joins Kaiser Aluminum

Rubber-faced end-liners with replaceable centers

. . . cut shot breakage up to 50%

. . . greatly increase end-liner life

With Gates rubber-faced shot blast discs you make BIG savings two ways:

1. **You save on shot because the rubber disc cuts shot breakage.**
2. **You save time and cost in making end-liner replacements.**

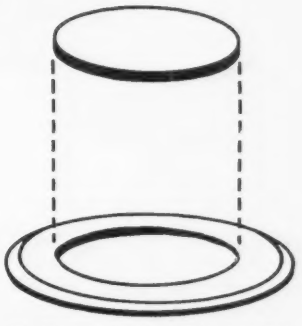
Here's why:

Heaviest wear on end-liners in shot blast and tumble blast machines comes in the center area. With either of Gates two types of disc (center patch, or hollow center), you replace only the center area as needed. Two or three center discs can be used before the main disc is finally worn through.

This important engineering development has increased end-liner service life up to FOUR TIMES.

And rubber protection of end-liners reduces shot breakage as much as 50% — giving you substantial savings on shot replacement costs.

For complete size and cost data, contact any of the Gates Authorized Contractors listed below, or write direct to The Gates Rubber Company Sales Division, Inc., Denver, Colorado.



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Center disc is recessed flush in hollow center of main disc. Center can be replaced without replacing entire end-liner.

Solid Disc with Center Patch

Both discs easily bolted to main structure of shot blast machine.

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Trenton, New Jersey

TPA-103A

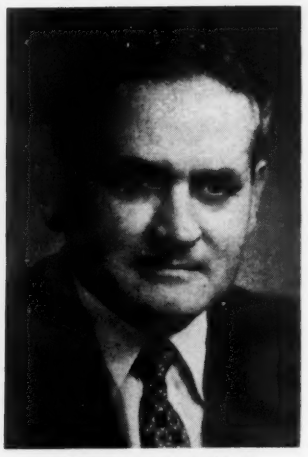
Circle 641 on Inquiry Card—Page 255

MEN OF INDUSTRY

WENDELL W. SNODGRASS
. . . Canton Chapter chairman

EDWIN J. COSFORD
. . . Canadian Steel chairman

ALLAN C. MacDONALD
. . . Canadian Steel pres.



GORDON L. McMILLIN
. . . Steel Foundries v. p.

Smelting & Refining Co., Perth Amboy, N. J., where he recently served as assistant manager of the aluminum department. He has held various offices in the AFS Light Metals Division, and is currently serving as its chairman.

Wendell W. Snodgrass, chairman of the Canton Chapter of the AFS for 1956-57, is head of the planning department, Massillon Steel Castings Co., Massillon, O. He has been with the company for 23 years and previously worked in the pattern shop, melting, foundry and sand control departments. A former treasurer and secretary of the Canton Chapter, Mr. Snodgrass was its vice chairman last year.

Clarence C. Roarick was appointed foundry engineer, National Engineering Co., Chicago. For 15 years he was associated with Mueller Co., Decatur, Ill., where for the past 6 years he was vice president-manufacturing and engineering.

Edwin J. Cosford, president-managing director, Canadian Car & Foundry Co. Ltd., Montreal, Que., has become chairman of the board, Canadian Steel Foundries Ltd., there. The latter company was formed to take over the facilities of the Steel Foundry Division of Can-Car. Other officers of the new company are: **Allan C. MacDonald,** president; **Gordon L. McMillin,** vice president-general manager; **J. Earl Clubb,** vice president-treasurer; and **Alexander C. Lawson,** secretary. Mr. McMillin was formerly assistant vice president of the Steel Foundry Division.

Frank C. Riecks, who retired from the Ford Motor Co. on Oct. 1 as technical assistant to the manager of foundries, has joined the Sutter Products Co., Dearborn, Mich., as executive vice president. Mr. Riecks spent 40 years with Ford in both this country and abroad. In 1947 he was made plant manager of the company's foundries and pattern shop, and later became project engineer for the Cleveland Foundry. He is a former national director of the AFS and received an honorary life membership from the society in 1955.

George M. Hartley, for the past 4 years sales manager, Chemical Materials Dept., General Electric Co., Schenectady, was appointed manager of marketing for the company's Metallurgical Products Dept., Detroit, succeeding **J. E. Weldy** who recently became consultant for the Marketing Services Division. Mr. Hartley, a graduate of Rensselaer Polytechnic Institute, joined GE in 1946. He was plant manager of the Schenectady Chemical Materials Dept., plant, prior to becoming sales manager.

Edward F. Better was named sales supervisor assistant, covering manufacturer-distributor relations, Chain Belt Co., Milwaukee. Mr. Better joined the company in 1953.

Paul S. Washburn, formerly a sales engineer, Norton Co., Worcester, Mass., was appointed field engineer

CLARENCE C. ROARICK
. . . joins Natl. Engineering

FRANK C. RIECKS
. . . joins Sutter Products

GEORGE M. HARTLEY
. . . department marketing mgr.

PAUL S. WASHBURN
. . . Norton field engineer

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Circle 642 on Inquiry Card—Page 255

MEN OF INDUSTRY

EARL J. LINDSAY
. . . Bay State Abrasive sales

PHILLIP HALL
. . . sales promotion mgr.

JOSEPH WRIGHT
. . . Magnet Cove Barium sales

FLOYD J. CROWLEY
. . . heads Michiana Chapter

in its Pittsburgh district office. A graduate of Amherst College, he joined Norton Co. in 1951.

Earl J. Lindsay was appointed abrasive engineer, Bay State Abrasive Products Co., Westboro, Mass., to cover North and South Carolina, eastern Tennessee, Georgia, and northeastern Florida.

Robert W. Nelson, vice president and executive assistant to the director of sales, American Air Filter Co., Louisville, was named director of a new administrative central staff to assist general management with administration and co-ordination of divisional and subsidiary activities. **John Hellstrom,** vice president-director of sales, was named administrator of American Air Division (Louisville Operating Division), formerly handled by **W. G. Frank,** company president. **James W. May** was appointed director of technical training. He was formerly technical director of the air filter products department.

J. C. Moroso, for the past year staff administrator in the sales department, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York, was named assistant to the general sales manager. After joining Electromet in 1936, he worked in the company's West Virginia plant on production assignments. He was transferred to New York in 1942 and became assistant to the works manager there in 1952.

Charles M. Schillmoller, until recently associated with Richfield Oil Corp., Los Angeles, as a corrosion engineer, has joined the staff of the West Coast technical field section, Development and Research Division, International Nickel Co., New York.

Phillip Hall, formerly sales engineer, A. Schrader's Son Division, Scovill Mfg. Co., Brooklyn,, N. Y., was named industrial sales promotion manager for the division.

Joseph Wright was named eastern foundry sales representative, Magnet Cove Barium Corp., Des Plaines, Ill. He attended Louisiana State University and joined Magnet Cove in 1952 as a chemist, working in the research program on evaluations of clays and their applications in molding sands.

B. Harold Lewis, New York district manager, Grinding Machine Division, Norton Co., Worcester, Mass., retired recently after 41 years with the company. Mr. Lewis worked in the order service department of the Abrasive Division, the order department of the Machine Division, and was supervisor of the sales service section until 1946 when he became sales representative in the New England area. **Frank H. Madigan,** formerly of the sales engineering department, has been appointed district sales engineer for the company's New York area. He will make his headquarters at Rudel Machinery Co., New York.

H. R. Powers, C. M. Andresen, and **L. J. Meyers** were appointed district representatives in the Pacific Northwest, Southwest and South Central sales areas, respectively, for Koehring Co., Milwaukee, and its subsidiaries, Parsons Co., Newton, Iowa, and Kwik-Mix Co., Port Washington, Wis.

A. V. Lorch was appointed pig and ingot product manager, Kaiser Aluminum & Chemical Sales Inc., Chicago, succeeding **Donald W. Walker,** who has been made foil product manager for the company.

Floyd J. Crowley, elected chairman of the Michiana Chapter of the AFS for the current year, since 1951 has been chief metallurgist, Benton Harbor Malleable Industries, Benton Harbor, Mich. He attended Campion College and University of Wisconsin. Mr. Crowley started his foundry career at Saginaw Malleable Iron Plant, GMC, Saginaw, Mich., later doing metallurgical laboratory work at Eaton Mfg. Co., and Chevrolet-Saginaw Gray Iron Foundry Division, GMC, Saginaw. He joined Benton Harbor Malleable in 1949 as metallurgist for the company's Gray Iron Division.

D. C. Stephens was named production manager, Goslin-Birmingham Mfg. Co., Birmingham. **Carter E. Putnam** succeeds Mr. Stephens as machine shop superintendent. **J. E. Morris** was appointed assembly shop foreman and **R. E. McLane,** chief inspector.

J. M. Poklemba was advanced to plant manager, and **R. J. Sherlock** to assistant plant manager, Union Steel Castings Division, Blaw-Knox Co., Pittsburgh. Mr. Poklemba joined the company in 1935 and Mr. Sherlock in 1942.

Allen Carlson was appointed territorial manager, Standard Products Division, Stephens-Adamson Mfg. Co., Aurora, Ill. With headquarters in Minneapolis, he will cover Minnesota, Iowa, North and South Dakota, and Montana.

Andrew B. Huntington has been appointed chief engineer, Ross Operating Valve Co., Detroit. A graduate of Yale University, he joined the company in 1952 as manager of production engineering.

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Test after test shows YELLOWSTONE BENTONITE to be the best foundry bentonite

In test after test, Yellowstone Bentonite proved the best! Here are results of a report made by an independent research laboratory (name furnished on request). Yellowstone was tested and compared with three other commercial western bentonites. Common testing procedures were those recommended by the American Foundrymen's Society.

- ★ **Yellowstone produced highest green strength.**
- ★ **Yellowstone produced highest green permeability under all conditions.**
- ★ **Yellowstone had the highest green toughness.**
- ★ **Yellowstone was the most durable of the western bentonites.**
- ★ **Yellowstone was above the average of the bentonites tested in dry compressive strength.**
- ★ **Yellowstone produced better surface finish than other bentonites.**

For quality, maximum economy, and assured uniformity every time, ask your distributor for Yellowstone Foundry Bentonite. It's the best bentonite on the market.

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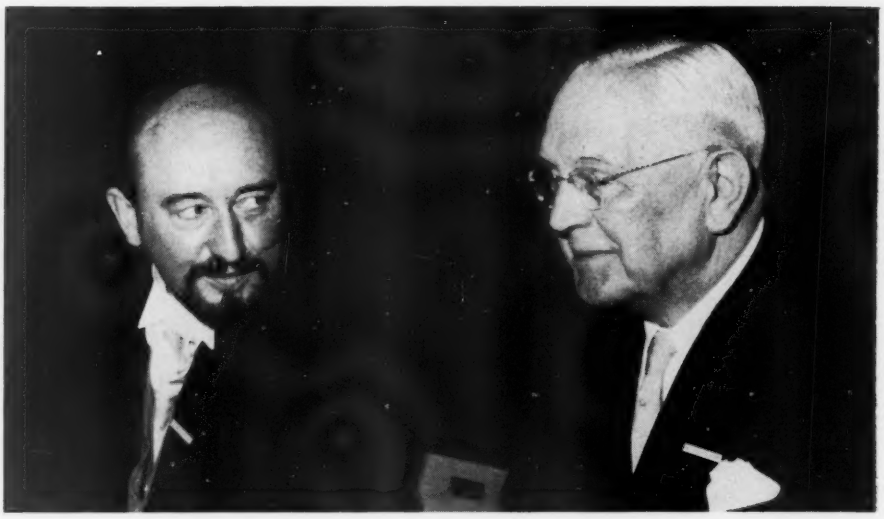
One of the Dresser Industries

Houston, Texas

Cast iron statue, "The Foundryman," at exhibit hall entrance



Dr. G. Schwietzke (left), president of VDG (the German foundry technical society) with M. Vuilleumier, president of the International Committee

International Foundry Congress

Attract Many Foundrymen to Dusseldorf

By VINCENT DELPORT
European Editor

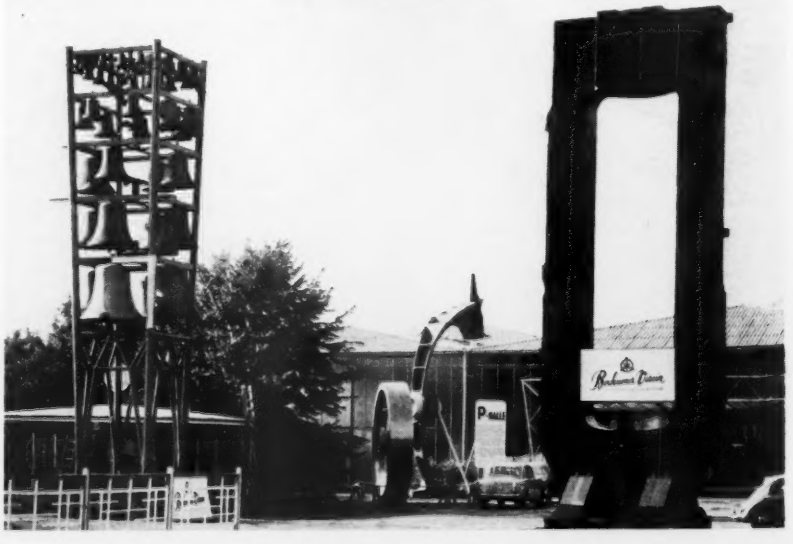
IN reborn Dusseldorf, a city of 660,000 inhabitants on the Rhine, and headquarters of the foundry industry of West Germany, more than 3600 foundrymen attended the 23rd International Foundry Congress, Sept. 1-9. The congress was sponsored by the International Committee of Foundry Technical Associations and organized by the Verein Deutscher Giessereifachleute (VDG), the German foundry technical society. The assembly included 1700 visitors from 30 nations outside Germany, of whom about 35 were American foundrymen. In conjunction with the congress, an international foundry exhibition, perhaps the largest ever held, attracted a reported total attendance of 200,000.

The formal opening was held in the main hall of the *Rheinhalle*, or hall of the Rhine (originally a planetarium), with Dr. G. Schwietzke, president of the VDG in the chair. He was supported by M. Vuilleumier, president of the Swiss association and president of the International Committee, and by Dr. A. B. Everest, immediate past president of the Institute of British Foundrymen and vice president of the International Committee.

Opening the meeting, President Schwietzke extended the greetings of his society to the visitors and stressed the importance of international foundry congresses as a means of exchange of information. This exchange results in the continuous progress of foundry practice and thereby brings about the improvement of casting quality. He recalled that it was exactly 20 years ago that an international congress of the foundry industry had been held at Dusseldorf. He mentioned the highlights of the present congress, to which the members would be looking forward, and referred to the importance of the exhibition, in which several countries were participating.

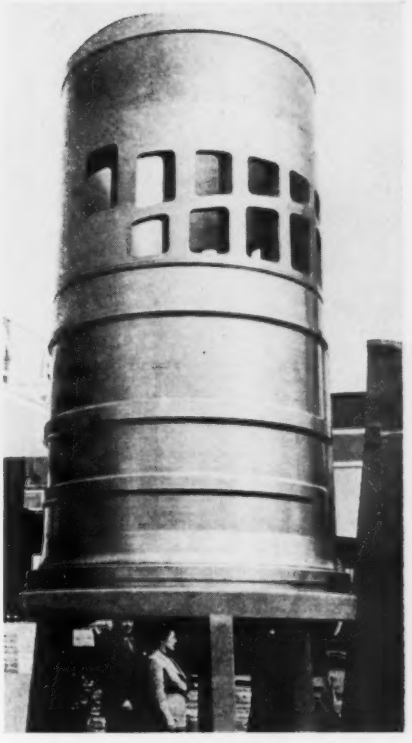
President Vuilleumier, following, spoke on behalf of the foreign visitors and expressed their pleasure at attending the congress. He also emphasized the benefits of these international meetings to the foundry industry, which contributed ultimately to the well being of mankind and helped toward better understanding between nations.

Castings exhibited included this 257-ton steel power press housing, said to be the largest ever made. The carillon at left has cast steel bells



Opening meeting of the International Foundry Congress at Dusseldorf, Germany, with President Schwietzke delivering his welcoming address

and Exhibition



Cast iron diesel engine cylinder on the exhibit gounds

Walter Hovelmann, president of Wirtschaftverbandes der Giesserei Industrie, the federation of iron foundry industries, also addressed the meeting and referred to the growth of the German foundry industry in recent years. In 1955, some 1000 ferrous foundries produced 3,160,000 metric tons of gray iron castings, 315,000 tons of steel castings and 165,000 tons of malleable iron castings. The Federal German Republic now ranks fourth in the world in production of castings made in ferrous metals.

President Schwietzke then announced that the council of VDG had decided unanimously to elect the following honorary members of their society:

H. J. Kuster, past president of the VDG, in recognition of outstanding services rendered to the foundry industry and to the society.

M. Vuilleumier, president of the International Committtee, in recognition of his important part in the activities performed by the committee.

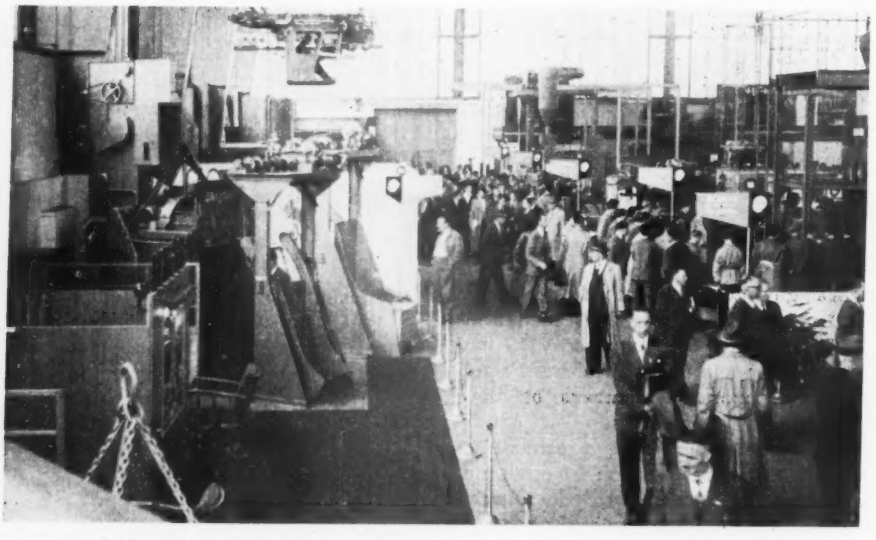
V. C. Faulkner, past president of the International Committee, in recognition of his contributions to the progress and development of the industry by disseminating valuable information in the technical press and through his personal efforts.

Two traveling scholarships also were announced, the award being made under the terms of the Piwowarski prize established in memory of the late Prof. Piwowarski of the University of Aachen. These scholarships are awarded to the authors of the best papers contributed during the year by foundry students.

A "Festival" lecture on "Man and Technology" then was delivered by Prof. Dr. H. Meessen, director of the Pathological Institute of the Academy of Medicine of Dusseldorf. This lecture reviewed the evolution of man as affected by biology, technical awareness and culture. In our times, more and more use has been made of machine and mechanical controls, culminating in the present stage of automation and specialization. The lecturer indicated that although the final control remains with man, the increasing use of mechanical and electronic controls, and of specialization in given directions, bring with them certain risks. From a biological standpoint, these risks are exemplified by damage due to radiation. From a cultural standpoint, they are illus-

View of road leading to the International Foundry Fair grounds. Building in background is Rheinhalle, the Congress meeting site

Part of a large exhibit conducted by Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago, at the Foundry Trades Fair



Both foundry equipment and castings were displayed at the Fair. This shows an aisle view in one of the six exhibit halls used

The nine-day Fair attracted visitors from 30 nations outside Germany, with a reported total attendance exceeding 200,000

trated by the fading out of true craftmanship. In the lecturer's words, "In the highest sense, man can continue to exist only if he remembers that he is an intelligent being."

The Burgermeister of Dusseldorf, Joseph Gockeln, then declared the exhibition opened. In a witty speech, he welcomed the visitors from all countries. He referred to the entertainment facilities of the city, but pointed out that behind this attractive front was a thriving, working town, industrially creative, the home of scientific research and of great administrative and financial institutions. He expressed the hope that visitors would experience and enjoy both aspects of the city.

On the following day, Sunday, more than 1000 congress visitors went by train to Rudesheim, one of the numerous wine growing districts on the Rhine, and returned to Dusseldorf by steamer, following some 125 miles down the winding river, festooned on each side by romantic hills ornamented by medieval castles.

The business of the congress began on Sept. 3 and continued throughout the week. Technical sessions were interspersed with visits to foundries in the districts surrounding Dusseldorf, and any spare time was devoted to visits to the extensive exhibition.

Present 26 Technical Papers

Twenty-six papers were presented at the technical sessions. Arrangements had been made for simultaneous translation in English, French and German. In one hall, transmission was by high-frequency waves; each head phone had a small antenna instead of wiring. Seven papers covered various aspects of cast iron practice; five concerned molding sands; malleable iron, alloy irons, steel and molding practice were dealt with in two papers each; and one contribution was devoted to shell molding. Various other subjects were discussed in five papers. Nine of the papers were official exchange papers from foreign associations, as follows:

American Foundrymen's Society: "Elevated Temperature of Molding Sands and Its Correlation with Casting Defects," by Harry W. Dietert, Detroit.

Belgian association: "Investigation of the Isothermal Changes of Cu-Cr and Ni-Cr Alloyed Cast Iron Containing 0.5 Per Cent Mo," by Prof. A. de Sy, University of Ghent, and J. van Eeghem, of Centre d'Etudes et de Recherches en Fonderie.

Danish association: "Future Problems of Research in Foundry Technique," by Von Ove Hoff, Copenhagen.

French association: "Influence of Gas Scavenging on the Graphitization of Cast Iron," by G. Blanc and

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Ret on 20 Mesh	2.2								
Thru 20 ret on 30	38.6	12.4	5.6	0.6	0.4	0.4			
Thru 30 ret on 40	57.6	70.8	56.2	37.2	30.2	21.2	4.0	1.2	0.6
Thru 40 ret on 50	1.4	16.3	34.8	52.0	55.8	51.4	34.8	30.4	23.8
Thru 50 ret on 70	0.2	0.5	2.8	9.0	11.4	20.6	44.4	48.2	42.0
Thru 70 ret on 100			0.6	1.0	1.8	5.2	14.4	17.8	26.4
Thru 100 ret on 140				0.2	0.4	1.0	2.0	2.0	6.2
Thru 140 ret on 200						0.2	0.4	0.4	0.8
Thru 200 ret on 270									0.2
Grain Fineness (AFS)	25.88	30.49	33.72	37.48	38.82	42.22	49.96	51.64	56.90

Unground Sand	5015	5010	5005	7030	7020	7010	C-30	C-10
Ret on 20 Mesh								
Thru 20 ret on 30								
Thru 30 ret on 40	1.2	0.4	0.2	0.2	0.2			
Thru 40 ret on 50	15.2	11.2	4.4	3.0	2.4	0.4		
Thru 50 ret on 70	40.2	35.2	31.2	26.2	18.0	8.2	0.4	0.2
Thru 70 ret on 100	35.4	37.4	41.2	42.0	45.0	46.6	28.4	8.4
Thru 100 ret on 140	6.4	10.8	15.4	16.4	20.0	23.2	44.8	50.2
Thru 140 ret on 200	1.2	4.0	5.6	9.6	11.0	15.4	18.8	28.2
Thru 200 ret on 270	0.4	0.8	1.4	1.8	2.4	4.2	5.0	8.8
Thru 270 ret on 325		0.2	0.6	0.8	1.0	2.0	2.6	4.2
Grain Fineness (AFS)	60.20	66.92	73.92	79.36	84.42	95.44	108.22	124.60

Ground Sand (Flour)	80M	100M	140M	200M	300M	325M	400M
Ret on 60 Mesh	10/20%						
Thru 60 ret on 100	25/30%	5%					
Thru 100 ret on 140	15/20%	14%	4%	1%			
Thru 140 ret on 200	10/15%	16%	6%	4%	2%	Trace	
Thru 200 mesh	25/40%						
Thru 200 ret on 270		10%	12%	6%	2%	0.5%	Trace
Thru 270 ret on 325		12%	8%	9%	11%	4.5%	2%
Thru 325 mesh		43%	70%	80%	85%	95.0%	98%

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N. Volianik, Centre Technique de Fonderie, Paris.

Institute of British Foundrymen: "The Development of Internal Stresses Leading to the Cracking of Gray Iron Castings," by Dr. H. G. Angus, and W. G. Tonks, British Cast Iron Research Association.

Italian association: "Practice in the Construction and Operation of the Basic Cupola in Italy," by David Masperi, Genoa.

Japanese association: "Oxide Patterns Appearing on the Surface of Molten Cast Iron," by O. Madono, of the Foundry Institute, Tokyo.

Netherlands association: "Behavior of Green Molding Sands during Shock Heating in Connection with the Occurrence of Surface Defects," by H. G. Levelink, Technical Foundry Center, Delft.

Swedish association: "The Application of the MTM System in the Planning of Foundry Work," by J. Edman, Skovde.

Another American contribution was by C. W. Briggs, technical director, the Steel Founder's Society of America, Cleveland. His subject was "Green Sand Molding of Large Steel Castings."

Discuss Casting Design

The whole of Sept. 3 was given up to a symposium of ten short lectures on "Design and Castings"; this feature was prepared in collaboration by the VDG and the Verein Deutscher Ingenieure, the association of German industries, and was closely connected with a special display arranged at the exhibition.

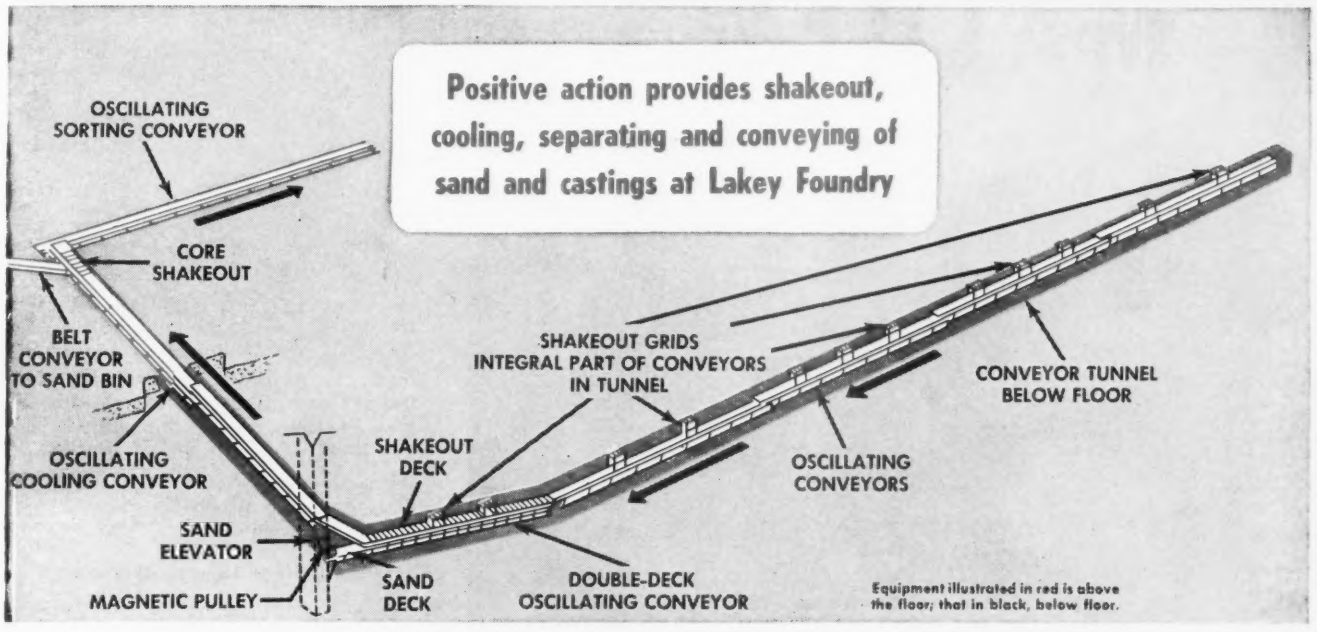
The closing ceremony of the congress was held in Robert Schumann Hall, in the exhibition grounds, on Sept. 8. Dr. Schwietzke gave a farewell address in which he expressed his thanks to Dipl. Ing. Philipp Schneider and to all others who had helped in the organization of the congress and exhibition. He was followed by President Vuilleumier, who expressed his appreciation of all that had been done for the benefit of the visitors. He briefly reviewed the activities of the congress and of the International Committee and expressed the hope that a large number of those present would meet again at Stockholm Aug. 19-24 next year.

President Vuilleumier then presented the Award of Honor to Johannes Croning, whose appearance on the platform was greeted with acclamation.

Lovers of music were treated with two concertos, one at the beginning, the other at the end of the meeting, played by the Dusseldorf Bach Society, under the direction of Prof. Dr. Joseph Neyses.

During the congress, the social

Gets MULTIPLE-DUTY with LINK-BELT Oscillating Conveyors

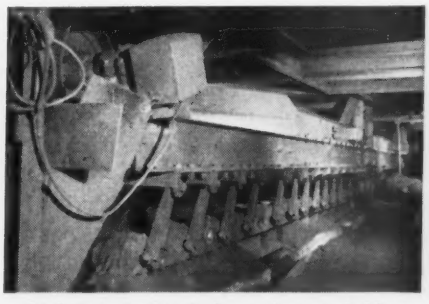

Positive action provides shakeout, cooling, separating and conveying of sand and castings at Lakey Foundry
OSCILLATING SORTING CONVEYOR
CORE SHAKEOUT
BELT CONVEYOR TO SAND BIN
OSCILLATING COOLING CONVEYOR
SAND ELEVATOR
MAGNETIC PULLEY
SHAKEOUT DECK
SAND DECK
SHAKEOUT GRIDS INTEGRAL PART OF CONVEYORS IN TUNNEL
DOUBLE-DECK OSCILLATING CONVEYOR
OSCILLATING CONVEYORS
CONVEYOR TUNNEL BELOW FLOOR
Equipment illustrated in red is above the floor; that in black, below floor.

HERE'S proof that the positive action of Link-Belt Oscillating Conveyors is not affected by surges. The installation at Lakey Foundry, Muskegon, Mich., has 430 ft. of oscillating conveyors performing multiple duties in handling 185 tph of sand and castings.

Five 48-in. wide oscillating conveyors in this system are located under the floor. All have shakeout grids integral with the trough and extending above the floor. Grid units function as tight-flask shakeouts, and sand and castings drop to conveyor trough. The fifth conveyor is double-decked. Sand conveyed on the lower deck passes under a magnetic pulley to remove metal, then is discharged into a bucket elevator. Castings on the upper deck are discharged to inclined oscillating conveyors for cooling and delivery to core shakeout. A flat-top oscillating conveyor above the floor is used for picking and sorting.

Link-Belt equipment and engineering experience — which have produced installations handling up to 450 tph — can bring similar high productivity to your own foundry. For facts on Link-Belt Oscillating Conveyors, call your nearby Link-Belt office or write for Book 2444. These conveyors in standard 36-in. wide sections are available from local stocks.

At shakeout stations, oscillating motion of conveyors breaks sand from flask when flask is set on grids extending up through floor. Sand and castings fall into oscillators.



Link-Belt double-deck oscillator is fed by four other conveyors in tunnel. Top deck carries castings; lower conveys sand under magnetic pulley to bucket elevator.

Worker sorts castings from 54-in. flat-top sorting oscillating conveyor, after the Link-Belt shakeout has knocked out the cores. Capacity is 35 tph.

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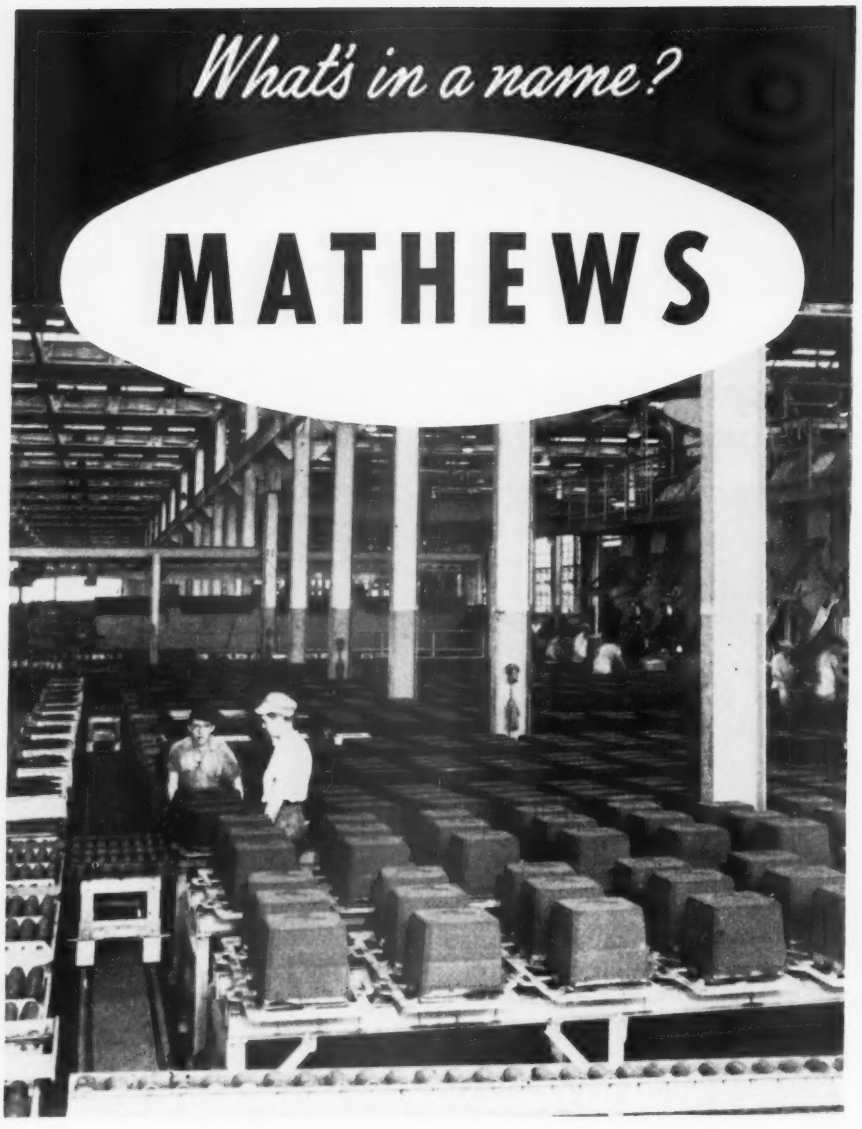

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program for visitors and their wives included visits to places of interest in and around the city and evening entertainments. Receptions were held for the official delegates to the International Committee by the Oberburgermeister of Dusseldorf, at Benrath castle, and by the president of the Dusseldorf Chamber of Industry and Commerce at Jagerhof castle.

For the week following the congress, two postcongress tours had been organized, with visits to many foundries. These covered a large area of Western Germany and gave proof of the spectacular revival of German industry and of the rebuilding of German cities.

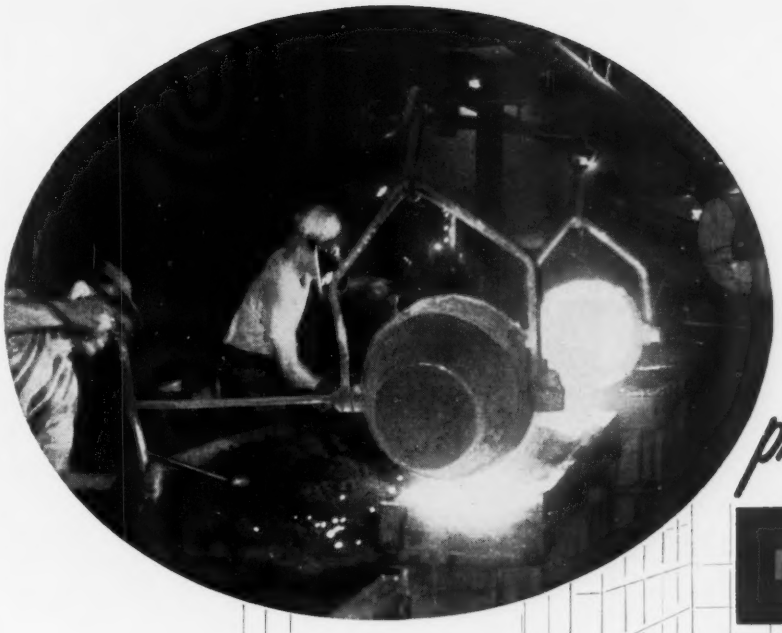
While the congress met, the subcommittees of the International Committee of Foundry Technical Associations held their meetings, as did the Past Presidents committee. The main committee held its meeting on Sept. 7. Activities of the International Committee and its subcommittees are growing in importance and are an important feature of international congresses, although the work of these committees is carried out behind the scenes.

Committee Has 16 Members

The foundry technical associations of 16 countries now have joined the International Committee—n a m e l y, Austria (joined this year), Belgium, Denmark, Finland, France, Germany, Great Britain, India, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland and the United States.

At the meeting of the main committee, President Vuilleumier (Switzerland) was in the chair. The application for membership of Verein Oesterreichischer Giessereifachleute, the Austrian foundry technical association, was accepted unanimously, and the two Austrian delegates, Dr. Ing. F. Sigut and Dipl. Ing. J. Krammel, were welcomed by the president. An application from the Federation of Foundrymen's societies of Yugoslavia was accepted, to take effect as of Jan. 1, 1957. Three other applications were considered and postponed pending further information from the associations concerned.

The committee unanimously approved a recommendation made on behalf of the German association, VDG, by Dr. Schwietzke, that the Award of Honor for 1956 be made to Johannes Croning, the inventor of the shell molding process. It also was agreed that the associations of Scandinavia, where the congress will take place next year, be invited to nominate the recipient of the 1957 award. This award, a bronze replica of the statue of Perseus, by Benvenuto Cellini, is offered each year by Comm. Mario Olivo. The committee then re-



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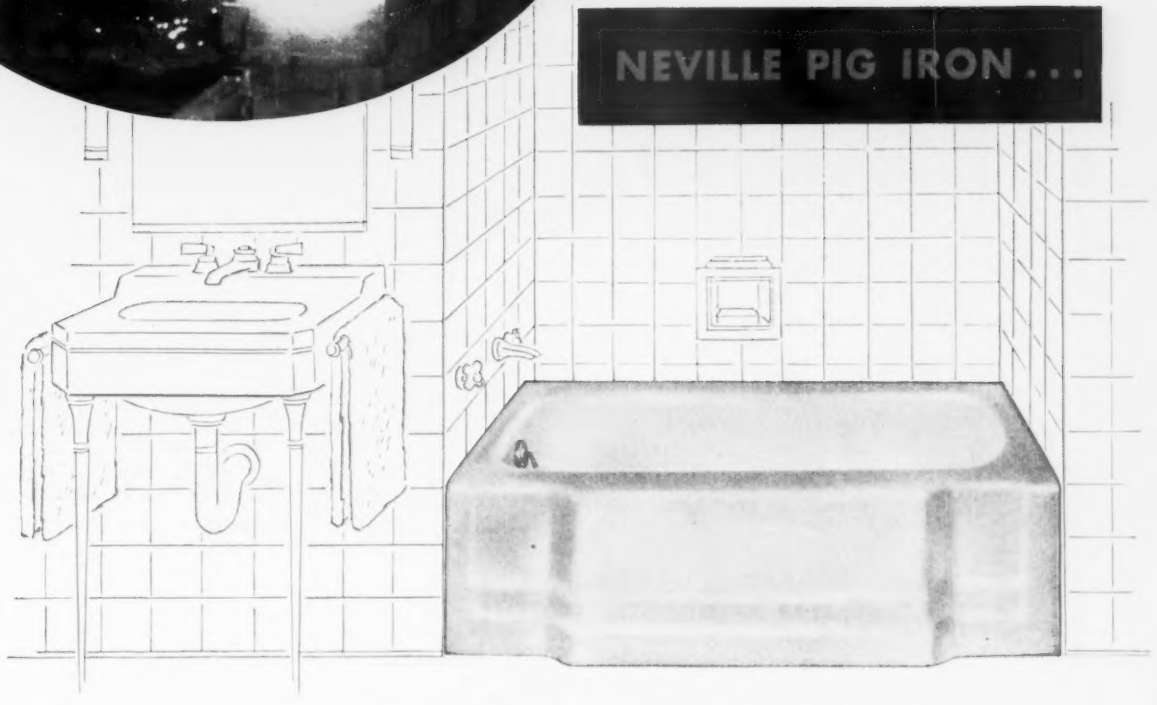

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ceived and approved the reports of the technical subcommittees.

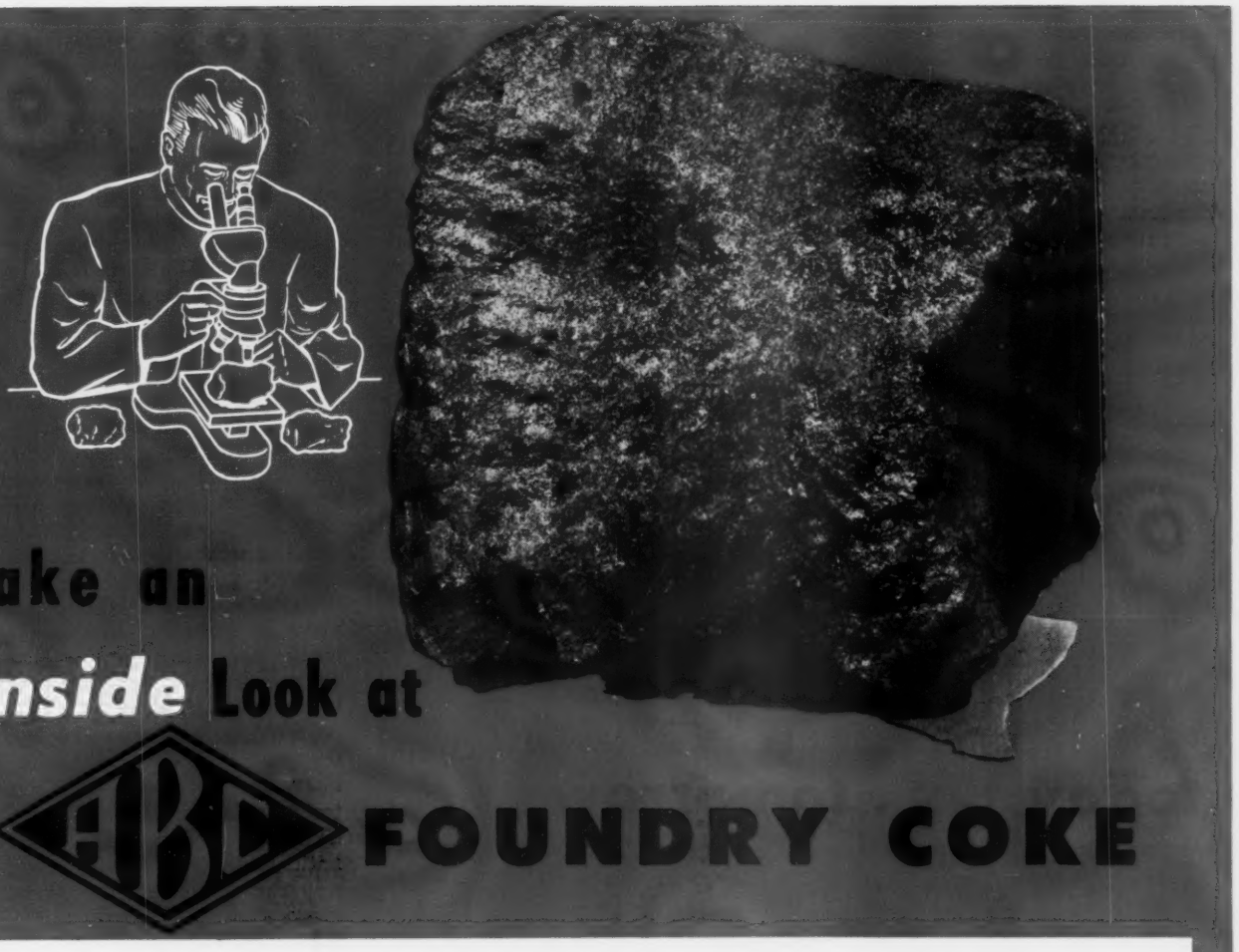
Chairman Mario Olivo of the dictionary committee reported that the support of UNESCO had been obtained and that approaches had been made to a small number of specialized publishers for eventually printing the dictionary as a commercial proposition. The chairman of the subcommittee appealed to the member associations to help actively in the translations in their respective languages of the foundry terms remaining to be dealt with. The secretariat, which has been in Milan, is to be transferred to Paris, where the French commission is completing its work on the lists of terms with their definitions in French.

G. Henon, chairman of the committee on foundry defects, reported that volume I of the atlas on cast iron and volume II on steel and nonferrous metals had been published. Volume I already had been translated into German and Finnish, and the original edition is out of print and is to be revised and reprinted. The member associations were asked to co-operate in keeping up to date the bibliography of literature on defects. The ultimate aim of the committee is to help improve the quality of castings.

Set Up New Subcommittee

Prof. Hans Jungbluth, chairman of the committee on testing cast iron, reported on the liaison between the committee and the International Standards Organization. It was decided to pursue investigations on tests other than the tensile test and to explore the possibility of some correlation between the results of tests. It was agreed that a subcommittee be formed for this purpose, with the participation of the Centre Technique de Fonderie (Paris), the British Cast Iron Research Association and the VDG, with the American Society for Testing Materials as corresponding member. The Belgian technical societies also would co-operate. The calendar of future international congresses was fixed as follows: 1957, Scandinavia (Stockholm); 1958, Belgium; 1959, Spain; 1960, Switzerland, (Zurich); 1961, (to be further considered); 1962, United States.

An invitation to hold the 1961 congress in Japan was declined regretfully because of the distance and the fact that the United States would be the host in 1962, which would make it impossible for European visitors to attend both congresses. The committee then unanimously elected these officers for 1957: President: Dr. A. B. Everest, past president of the Institute of British Foundrymen, and vice president of the International Committee. Vice president: The Verein



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Deutscher Giessereifachleute was invited to nominate the vice president for 1957 from its own association. Honorary secretary: George Lambert was re-elected. Honorary treasurer: For this new post, Vincent Delport, European editor, FOUNDRY, was elected.

The Exhibition—Of outstanding importance was the International Foundry Fair (GIFA), which was staged in conjunction with the congress, under the management of Dipl. Ing. Philipp Schneider, in the vast exhibition grounds bordering the Rhine. Both from the point of view of display interest and space occupied it was an all-time European and probably a world record foundry exhibition.

Various sections of the exhibits were shown in six halls which, in addition to the outdoor sections, covered over 50,000 square yards. Every aspect of foundry and auxiliary activities was displayed by live, static or illustrated exhibits.

Of special interest was a hall, covering 13,000 square yards, in which were displayed castings weighing from a few ounces to many tons. No better means could be devised to emphasize the part played by castings in the making of capital and consumer goods. Outstanding in the outdoor exhibits was a housing for a power press, cast in steel by Bochumer Verein, of Bochum, Germany, This was claimed to be the world's largest steel casting. The finished casting was 37.5 ft high, 14.5 ft wide and weighed 257 net tons. It required 400 tons of molten metal. Several other castings, weighing between 50 and 150 tons, also were shown. The exhibits were divided into three main groups: Products of the foundry industry (castings); foundry machinery, plant and equipment; and foundry raw and auxiliary materials.

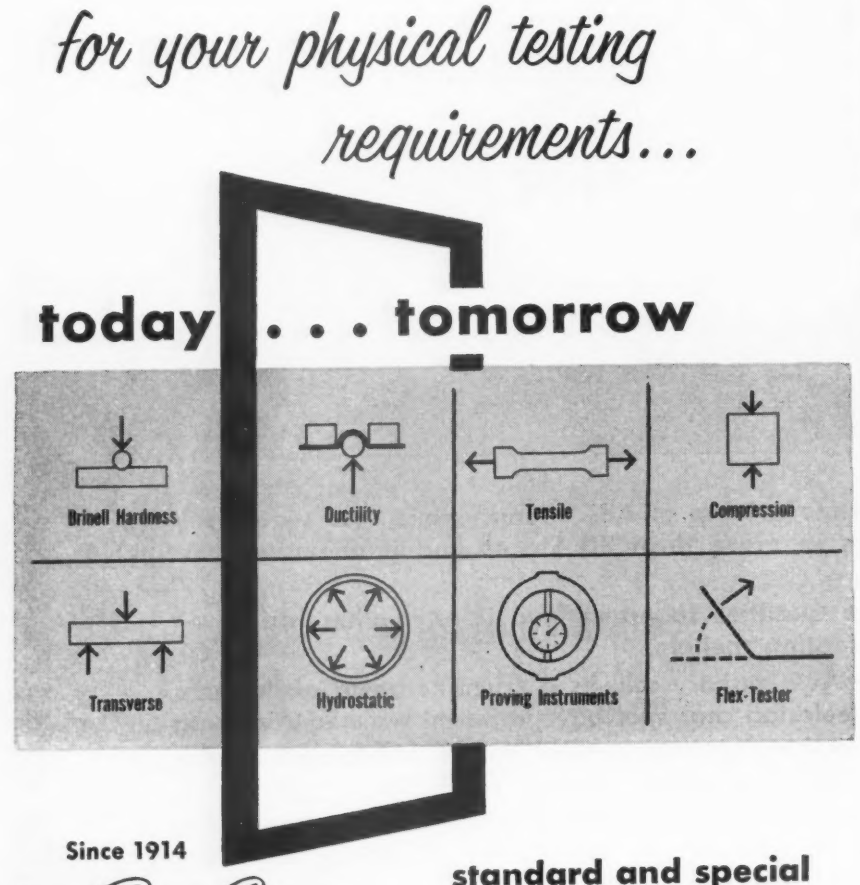
The hall containing the castings exhibits was linked to the main exhibition grounds by an aluminum bridge. Among the exhibits were displays of castings sent by the technical organizations of Belgium, France, Italy and Switzerland. In this same hall, a large section was occupied by the combined exhibit of the VDI, the German federation of industries and the VDG, the German technical foundry association, which showed typical castings, with explanations concerning their design. This was the exhibit associated with the symposium on "Design and Castings" already mentioned. It stressed the importance of consultation between designer and founder from the conception of the part to be cast.

Another hall accommodated transportation, handling equipment and pneumatic tools. Some lift trucks were shown in operation outside. In the same hall was a comprehensive exhibit on professional and vocational training.

American Firms Exhibit

American participation at the show included an exhibit in its own hall, built of transparent, plastic material, by Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago. Equipment in this exhibit was demonstrated in operation and attracted many visitors. It included a shell molding machine, a shell sand muller, a sand-slinger, molding machines, a portable shell sand muller and a shell coreblower. Another exhibit from the United States was that of Shallway International Corp., Palo Alto, Calif., which demonstrated its shell molding equipment and shell coreblowers.

From Great Britain, British Moulding Machine Co. Ltd., Faversham, Kent, and Foundry Equipment Ltd., Leighton Buzzard, had prominent stands displaying molding machines and other foundry plant. Cupodel Ltd., Birmingham, designers of foundry plant and equipment, and Foundry



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And other principal metalworking centers.

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easiest to operate

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One-lever bucket control
tips back • raises • dumps • lowers

The new-model HA "PAYLOADER" with its simple control system, smooth hydraulic brakes and full anti-friction steering mechanism is easy to operate at high output rates the full shift. Ease-of-operation is only one feature of the model HA that enables it to scoop-up, carry and deliver bulk materials faster and at less cost than heavier machines with larger engines. Other outstanding production features are the big bucket payload capacity of 18 cu. ft. (2,000 lbs.), exclusive 40° roll-back bucket action and hydraulic load shock absorber. Fork and sweeper attachments are also available for the model HA to increase its usefulness. Larger tractor-shovels in the complete, proven "PAYLOADER" line (bucket capacities up to 2¼ cu. yd. or 7,500 lbs.) give proportionately greater production. There is a nearby Distributor who would like to demonstrate the model HA or a larger "PAYLOADER" — whatever size best fits your needs.

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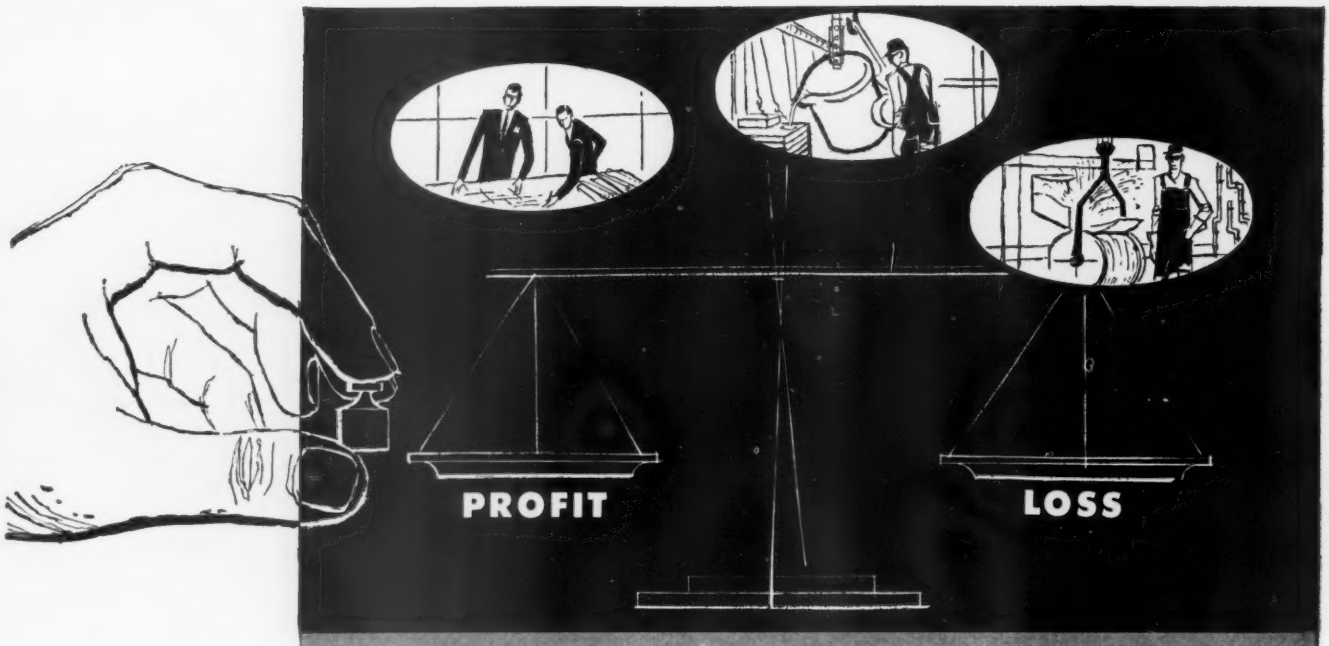

Knight services include:

- Foundry Engineering
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- Cost Control
- Production Control
- Modernization
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- Materials Handling
- Automation
- Survey of Facilities
- Architectural Engineering
- Construction Management

The sound way to REALIZE ANTICIPATED PROFITS is to AUDIT your operations

In foundry operation, making the best use of facilities and manpower determines the balance between profit and loss.

In many foundries, management and operation audits by experienced Knight engineers have helped to swing the balance to profit—through low-cost, readily effected improvements.

A recent Knight audit for a Michigan foundry resulted in substantial production increases and reduced costs. Improvements included the installation of a conveyor which eliminated handling . . . a rearrangement which increased capacity without additional floor space . . . and automatic timing devices which brought accurate process control and increased production.

These simple low-cost changes, accomplished without interruption to production, are part of a coordinated plan which is designed for future expansion requirements.

If you are interested in an audit of your operations to establish a program of improvement, take advantage of Knight experience and call or write our Chicago or New York office for prompt attention, without obligation.

EVIDENCE OF EXPERIENCE

Lester B. Knight & Associates, Inc.

Management, Industrial and Architectural Engineers

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC.

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Services Ltd., Birmingham, also had stands. Individual exhibits also were shown by firms from other countries.

There were many indications of the growing trend toward automatic control and operation. Among the more spectacular exhibits, shown in operation, was a complete, automatic layout, by Badische Maschinenfabrik, A.G., of Karlsruhe-Durlach.

It was comprised of a four-point molding station where the cope and drag were automatically filled with sand from overhead, controlled hoppers. The molds were pushed onto a conveyor which carried the two parts to a station where the drag was slightly lowered and the cope automatically rolled over and placed exactly on the drag. Another conveyor took the completed mold to the pouring station, from which it was conveyed to a "demolding" station where the casting was pushed out of the mold and dropped onto a shakeout. The empty flasks then were carried back to the molding station.

All operations were timed to achieve synchronization, and only placing of the cores and pouring were done by hand. No metal was poured at the show. This is claimed to be the first system of its kind in Europe.

Shell Molding Draws Attention

Another exhibit which attracted considerable interest was the demonstration of one of the latest types of automatic shell molding plant on the stand of the firm of the original inventor, Croning & Co., of Hamburg-Altona. There were many other outstanding displays.

Carefully planned exhibits in one section showed by charts and colored illustrations what might be termed the importance of the human element: Color psychology, showing the effects of various colors on machines and walls on the operator; noise measurement and means of reducing noise; the physiology of effort, including diet charts; protection against dust, heat, etc.

In some of the halls, a section devoted to vocational training explained the purpose, operation and fundamental principles of the various categories of exhibits.

Throughout the week of the exhibition, over 200,000 visitors passed through the turnstiles. Many organized groups from factories far afield made special trips of inspection. Of the 428 exhibitors, 71 came from 14 foreign countries. All credit is due to those responsible for the organization of this event, and in particular to Dipl. Ing. Philipp Schneider, director of the VDG, who also had much to do with the congress itself.

Two days were devoted to visits to foundries within traveling distance of Dusseldorf.

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PATENT PENDING

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NEW SIMPLICITY . . . a lapped spool sliding in a hardened sleeve provides the valving action—*One moving part.*

NEW RELIABILITY . . . the valve has no moving seals; eliminates wear, sticking, swelling of elastic seals. Gives positive, trouble-free performance.

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NEW DESIGN . . . full sub-plate mounting, watertight solenoid enclosures, integral junction boxes on all double solenoid models, side ports, bottom ports, O-ring manifold mount . . . all are standard on the SA Series.

The SA Series offers a complete line of actions, single solenoid spring return, double solenoid momentary contact and double solenoid spring centered 4-way actions . . . single and dual pressure versions. 54 different models in sizes ¼" through ¾" pipe. The most complete family of 4-way air valves available.

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Send me your catalog No. 8000 on the new SA Series Valves.

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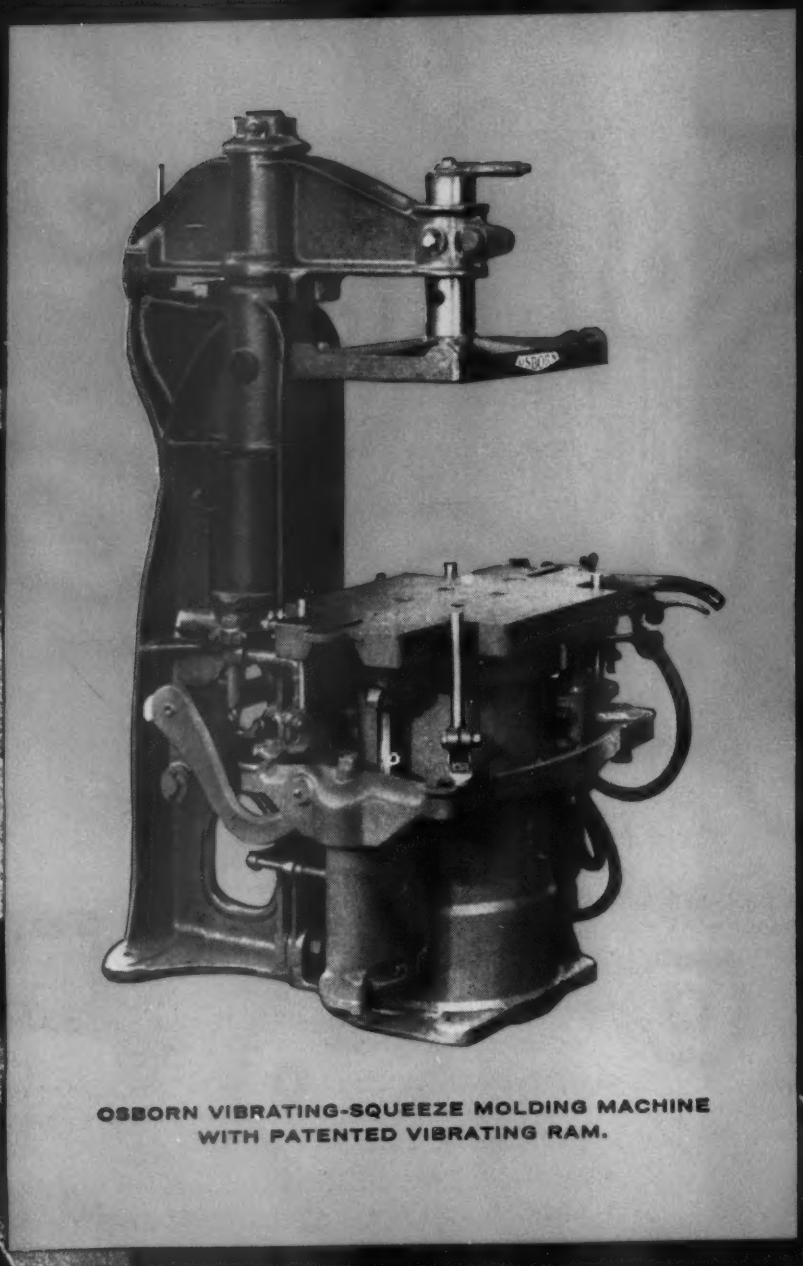

OSBORN VIBRATING-SQUEEZE MOLDING MACHINE
WITH PATENTED VIBRATING RAM.

FAST, A

ACCURATE MOLDING

OSBORN Vibrating-Squeeze Machines have a simultaneous vibrating-squeeze action which results in a superior flow of sand. Consequently, molds are hard and uniform . . . have clear cut impressions of fine detail. Production is increased because the separate jolt operation is eliminated.

These vibrating-squeeze machines are ideal for a wide variety of intricate castings, particularly where fine detail, good finish and accurate cast dimensions are required.

An Osborn Foundry Specialist will gladly recommend the proper machine for your particular applications. Write *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Leader in mechanization for the foundry

OSBORN®

CORE BLOWERS
MOLDING MACHINES
INDUSTRIAL BRUSHES

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

STUART N. GREENBERG
. . . third generation

Above—Fireproof, three-story modern building in San Francisco is the home today of M. Greenberg Sons Brass Foundry & Machine Works. *Below*—This building housed the company at the time of its inception, in 1854, by Morris Goldberg, a brass molder

Third Generation Operates

CALIFORNIA BRASS FOUNDRY

By DEWAR FORBES

NO ONE can be in California long without noting the name Greenberg. It stands for M. Greenberg's Sons Brass Foundry & Machine Works, San Francisco, and appears on fire hydrants, fire protection goods, bronze valves, art bronze products for cemeteries and mausoleums and historical plaques. It appears in the great buildings of San Francisco and Los Angeles, and world travelers can see it in Australia, the Orient, Central and South America and Saudi Arabia.

The company's history began when Morris Greenberg, a practical brass molder, arrived in San Francisco in 1851. Like James Lick, the West's great philanthropist, he decided to follow a business he knew, instead

View of a portion of the foundry illustrates good working conditions which are one aspect of the company's generally progressive policy

AMASTEEL SHOT

GENUINE ELECTRIC FURNACE STEEL

DELIVERS MORE IMPACT ENERGY PER POUND!

Effective surface cleaning depends on *Impact Energy* properly delivered to the casting. AMASTEEL lasts longer at the 'right' particle size and continues to provide the proper high impact after other types of shot have been reduced to ineffective powder.

COMPARE THE *CAPACITY* TO DELIVER FOOT POUNDS OF ENERGY . .

AMASTEEL Shot . . . . 2,000,000 Ft. Lbs./Lb. of Shot
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AMASTEEL Shot is available in ALL S.A.E. Shot Sizes 780, 660, 550, 460, 390, 330, 280, 230, 170, 110, 70

THE EARTH'S BEST BLAST MATERIAL

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Originators of Cast Steel Shot
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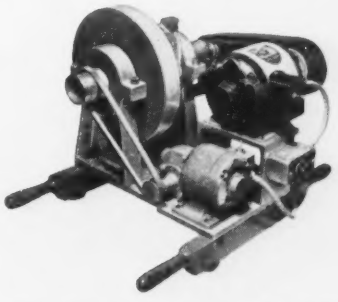
TEST PROVED BEFORE YOUR EYES!



The Alloy Metal Abrasive Test Machine gives rapid shot quality analysis and comparison of shot materials. Our engineer will recommend the correct abrasive for YOUR application and PROVE its effectiveness . . in YOUR plant . . in a matter of MINUTES

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As sales representatives for America's leading producers of quality foundry commodities, we are especially proud of our association with The Woodward Iron Company, the nation's largest independent producer of highest quality foundry and malleable pig iron since 1882.
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Established 1890

of becoming one of the 95 per cent of the gold seekers who found no gold, and he went to work in a small foundry in San Francisco. By 1854, only five years after Peter Donahue had made the first casting in California, Mr. Greenberg, with very little capital but a lot of courage, started his own foundry, which he called the Eagle Brass Foundry.

Patternmaking as a separate craft was just in its infancy, and on pine board he made his drawings and any of the patterns needed for his first products. Some of those products were spikes of bronze for planks of ships, hinges and ornamental brass castings for the homes springing up on surrounding hills and bells for the Gold Rush churches.

He began with practically no help, but by the Civil War period, in the 1860s, he had expanded to 15 employees and made bronze cannons for the Union Army. Ten years later he perfected the first complete unit manufactured in the foundry, the California-type fire hydrant, which has been one of the firm's specialties ever since. In the years that followed, he expanded his plant to 40 employees, with complete pattern, machine and plating shops.

Third Generation Takes Over

After his death in 1884, his son, Joseph Greenberg, took the helm, and it was he who saw the plant through the 1906 earthquake. Two sons of Joseph Greenberg, Maurice Greenberg and Stuart N. Greenberg, took over after his death in 1912. And after that, real expansion began.

In 1942, Maurice Greenberg passed away, and his younger brother, Stuart, took charge. Today at 765 Folsom Street, San Francisco, in its own, fireproof, three-story building, the company operates one of the leading brass foundries in the country, the largest on the Pacific Coast. More than 250 employees are busy on a variety of brass castings which have attained a wide distribution all over the world. Mr. Greenberg is assisted in the management of the plant by his son Stuart Jr. and his nephew John Greenberg.

Except for time out which he spent as a pilot in World War I, Mr. Greenberg's entire adult life since 1913 has been at Greenberg's. Few men are more active in the civic affairs of San Francisco than he is. Space does not permit giving chapter and verse of all his good works. Suffice it to say that he is an ardent supporter of every movement for the welfare of his native city.

It has been suggested that Mr.

MORE and MORE FOUNDRIES

"See the Light"

137 AAF FURNACE HOODS 1206 TONS/MELT — **1956**

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Electric melting furnaces emerge from haze of smoke and dust with installation of AAF Furnace Hood and AMERjet combination

137 electric furnaces are operating today in foundries where smoke, dust and fumes are just a memory. Visibility is unlimited the year 'round, and workers "never had it so good". You, too, can achieve these same benefits with an AAF Furnace Hood and AMERjet Fabric Dust Arrester.

AAF Furnace Hoods reduce required foundry ventilation with attractive heat saving and improved visibility. Designed for all makes of electric melting furnaces (top and side charge) from ½ to 75-ton capacity. The AAF AMERjet is the ideal exhauster-collector for this service. It removes all visible fumes and smoke.

Let this proven AAF combination make your electric furnace the brightest, cleanest operation in your foundry. Call your local AAF representative, or write direct for complete information.

AAF herman nelson **American Air Filter** COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky
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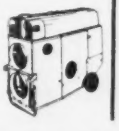

Illinois Heating Specialties

BETTER AIR IS OUR BUSINESS

AAF Electric Furnace Hoods

AAF Type K Exhauster

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Greenberg would be a suitable candidate for a memory test on the television quiz show "The $64,000 Question." He knows not only all his employees by name, but also their wives—and, for good measure, most of their children. When a new baby arrives, he always sends the mother a gift.

"You must always be doing something for other people. That is only common decency. We were put on earth to do something for mankind," Mr. Greenberg says.

Under his direction, the foundry, in its present location for more than 30 years, has been completely rebuilt, and new equipment has been added as required. Employee relations are of the best. The company's insurance and pension plan has been used as a model. Any visitor will notice the fine spirit of co-operation that characterizes the employees, an attitude which no doubt is a factor in the success of the firm.

Every one seems anxious to help a visitor. The plant is clean and well lighted, with every possible convenience for the workers. Norman Barnett, foundry superintendent, has been with the company for many years. Many craftsmen have spent all their working lives at Greenberg's.

The president operates in a bleached walnut office, complete with a flower arrangement. Offices and washrooms would do credit to a first-class hotel. Every rule usually associated with a school of business seems to be broken. No charts or graphs are in evidence—only examples of the foundryman's art.

Besides fire hydrants and fire protection brass goods, industrial, navy, and maritime bronze valves, plaques, etc., the company is prepared to tackle any other job in brass or bronze. The gold-plated shower door handles for San Simeon, the late William Randolph Hearst's castle, and the bronze ladders for the swimming pools of Lawrence Tibbett and Will Rogers, to mention only a few items, were cast at Greenberg's.

The firm is always on the alert for world markets for their products, which are already on the high seas. During the last war it received congratulations for its war work from leading Army and Navy men, including General MacArthur, General Eisenhower and Rear Admiral E. L. Cochrane.

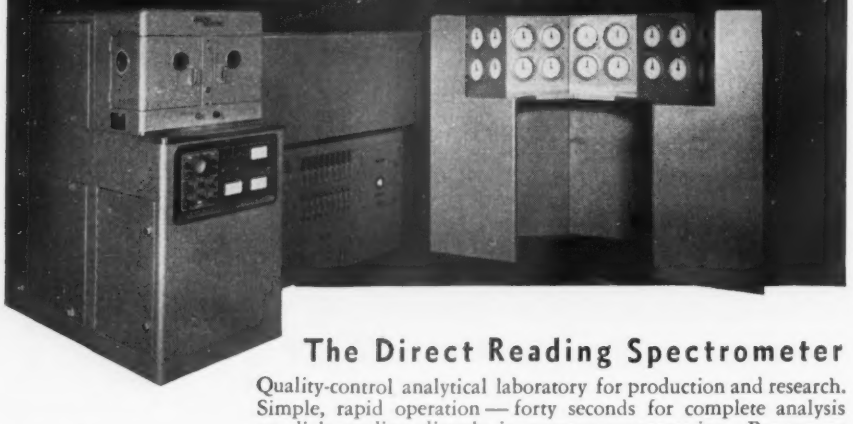
Plant Is Highly Modern

The main building of the plant is 250 by 150 ft and three stories high. Of steel and concrete, it is the most substantial building in that district of San Francisco. The pattern shop is situated on the top floor, with ample room for a dozen craftsmen. It is modern in every respect. On this floor, also, are the ornamental finishing shop and light machine shop.

On the second floor are the general warehouse, employees' washrooms and pattern and general storage. The shipping department and the machine shop are on the ground floor, the greater part of which is occupied by the foundry. Comfort of employees is a prime consideration, and the foundry is equipped to handle production work as well as fine custom ornamental work.

The melting equipment has a daily capacity of 25,000 lb of metal. It consists of both oil and gas-fired units, including large crucible and reverberatory furnaces. The progressive nature of the firm is exemplified by the processes it employs. In addition to conventional sand molding, they include shell molding and coremaking, CO_2 molding and coremaking and investment casting. A complete system of sand control is operated.

SPECTROGRAPHIC EQUIPMENT
for Metal Analysis by
Baird – Atomic



The Direct Reading Spectrometer

Quality-control analytical laboratory for production and research. Simple, rapid operation — forty seconds for complete analysis on dials reading directly in percent concentration. Permanent optical alignment with the Automatic Servo Monitor. Other features include: unique (patented) measuring system . . . plug-in components assuring continuous operation . . . rugged design for plant operation . . . and versatile specimen holders.

Baird-Atomic offers a complete line of spectrographic equipment for the analysis of metals in production and fabrication.

B-A instruments provide rapid, accurate analysis . . . simple, stable operation, trouble-free economical performance.

Spectromet Designed for production-floor operation by non-technical personnel. Sealed housing provides complete environmental protection of optical and electronic systems. Spectromet provides rapid direct-reading results, extremely simple operation. No critical adjustments. Automatic Servo Monitor for permanent optical alignment. Analysis of eight elements in 40 seconds.

Complete Spectrographic Laboratory

Baird - Atomic, a pioneer in the emission spectrographic instrument industry, offers a complete line of equipment for a spectrographic laboratory. Over twenty years of experience and design are incorporated into the following components: Three-Meter Grating Spectrograph, with its 20-inch camera; Double Beam Densitometer Comparator, employing an optical null-balance system and allowing for direct density measurements on a linear scale; Calculating Board, to easily translate densitometer readings into percent concentration values; and Spectrographic Source Unit, whose versatility supplies a full choice of excitation conditions for all emission problems.

Complete Technical Information Available Upon Request.

BAIRD ATOMIC *Baird Associates – Atomic Instrument Co.*
33 UNIVERSITY ROAD, CAMBRIDGE 38, MASSACHUSETTS

Magnesium Association Is Optimistic about Future

MAGNESIUM producers and consumers exude optimism over business prospects for their industry the balance of this year and the future. Expanding consumption in existing wrought and cast applications and birth of new uses, it is felt, are certain to carry production curves upward for both primary and secondary metal.

This was the atmosphere in which the Magnesium Association conducted its annual convention in Chicago, Oct. 4-5, with an attendance of over 400. Association President Daniel T. Wellman, president, Wellman Bronze & Aluminum Co., Cleveland, emphasized that in the organization's short life of 12 years, magnesium has gone a long way. And although the metalworking industry is experiencing a shortage of engineers and technical men, magnesium may fare a little better because it is still a glamor metal.

According to estimates prepared by the Dow Chemical Co., Midland, Mich., producer of primary magnesium, growth of this metal is quite similar to aluminum, allowing for about 35 years difference in the start of industrial volume use. It points out that starting with a 1950 base, the President's Material Policy Commission in June, 1952, predicated an 18-fold expansion in the consumption of magnesium by 1975, equivalent to a 14 per cent per year growth rate.

A feature of the convention was a panel discussion in which nine speakers brought up to date technical information in various areas of magnesium processing. In connection with alloy properties, it was emphasized by R. E. Bockrath, Dow Chemical Co., that thorium improves and extends the life of magnesium alloys.

For example, the recently developed magnesium alloy group designated as HK 31 containing 3 per cent thorium and 0.75 per cent zirconium has properties which are attractive in the 500-600°F temperature range. This alloy weighs about one-fourth as much as steel, retains high strength and elastic modulus to temperatures of about 600°F, has good creep resistance, can be heat treated and welded and is available in cast and wrought forms.

Dr. Fred J. Dunkerley, Rolle Mfg. Co. Inc., Lansdale, Pa., discussed "Casting Techniques." His presentation covered the four methods of casting—sand molds, permanent molds, die casting and investment molds—the advantages of each and suitability of magnesium for each. He emphasized that progressive foundries recognize they have essentially only service to sell.

Under the title of "Inspection," Robert Simpson, Bendix Foundries, Bendix Aviation Corp., Teterboro, N. J., assumed the foundryman's viewpoint in his discussion. He pointed out that the study of defects in castings by nondestructive processes frequently results in the development of foundry methods which produce better castings.

"Ready to Pour?"

3 IMPORTANT FEATURES of
FOX
Swing Frame
GRINDERS

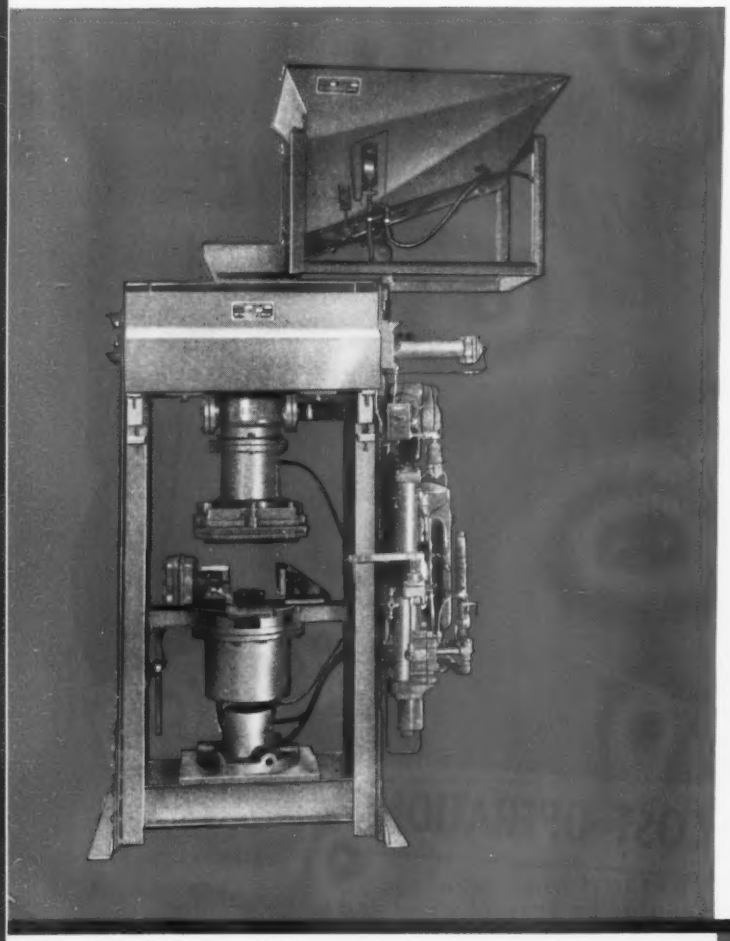
- **Perfect center balance** of wheel and motor ensures grinding ease and efficiency.
- **"Worker safety"** is carefully provided.
- **Greasing** required only once every six months . . . guaranteed for two years against repairs, exclusive of electrical equipment.

FOX GRINDERS, Inc.
OLIVER BUILDING PITTSBURGH 22, PA.

A NEW **DEMMLER** AUTOMATION TEAM

FOR HIGH SPEED, CONTINUOUS, FLEXIBLE OPERATION

Now available in unmatched Demmler quality is a new team that permits automated production of cores — continuous, uninterrupted. Fully tested, backed by foundry figures proving highest production records, lowest maintenance costs, greatest flexibility. Write for complete engineering data.



1 SERIES 100 AUTOMATIC CORE BLOWERS

Four sizes, for cores from 2 oz. to 350 lbs.

Blows or Shoots cores, as preferred

Equipped with **both** stationary and slotted sleeve sand magazine feature. Automatic sand agitator optional.

Accurate 10" **draw stroke** permits drawing cores on same machines.

2 AUTOMATIC CO_2 GASSING MACHINE

Equipped with **exclusive** gassing hood; handles full plate of cores at one time.

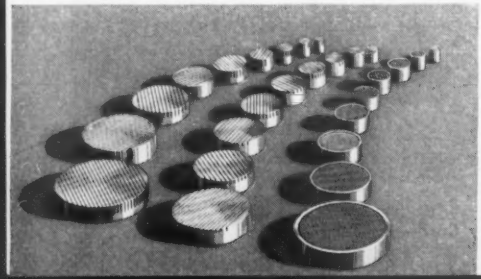
Handles continuous-operation output of high speed Demmler core blower.

Can be furnished with clamping chucks and injection head if desired.

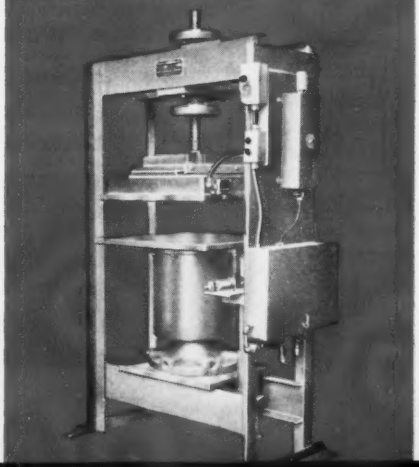
Gassing time and pressures adjustable to meet any core requirements.

PRECISION CORE BOX VENTS

Many sizes, slot widths and screen meshes are available in brass and steel. Write for descriptive literature.



NEW HL 150 MESH VENTS: New general purpose vent which practically eliminates the cleaning courser screens demand. Write for literature.



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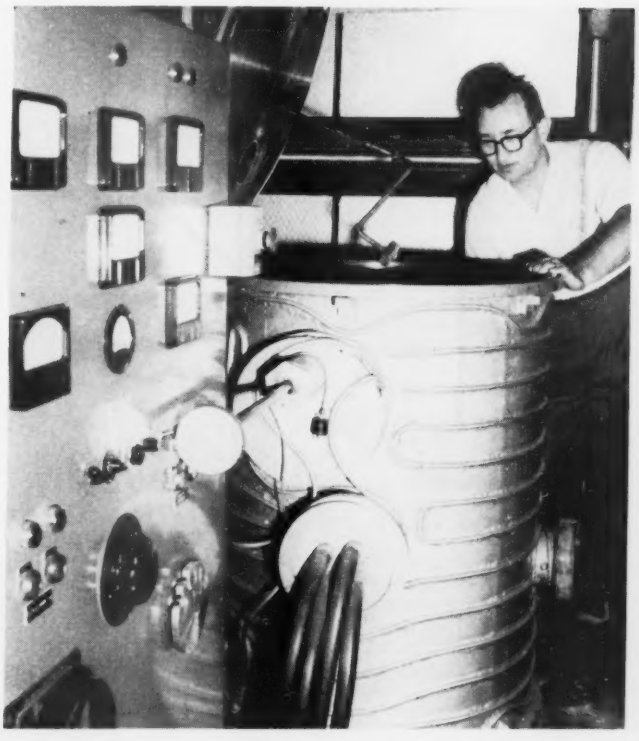
News Views

ROBBY RETIRES: L. P. Robinson, center, retired Oct. 1 as vice president, Archer, Daniels, Midland Co., and head of its Foundry Products Division, Cleveland. Shown here left to right at a dinner meeting honoring him are Frank G. Steinebach, FOUNDRY; Emil G. Schmidt, Fanner Mfg. Co., Cleveland; Mr. Robinson; Fred J. Walls, International Nickel Co., Detroit; and J. C. Gore, retired Chicago manager, ADM

MOVES SERVICE SCHOOL: Clark Equipment Co. has moved its service school, formerly located in Jackson, Mich., to completely new quarters at Battle Creek. During the three-week course at the school Clark teaches maintenance men from customers, dealers and government agencies how to service and repair the trucks produced by its Industrial Truck Division

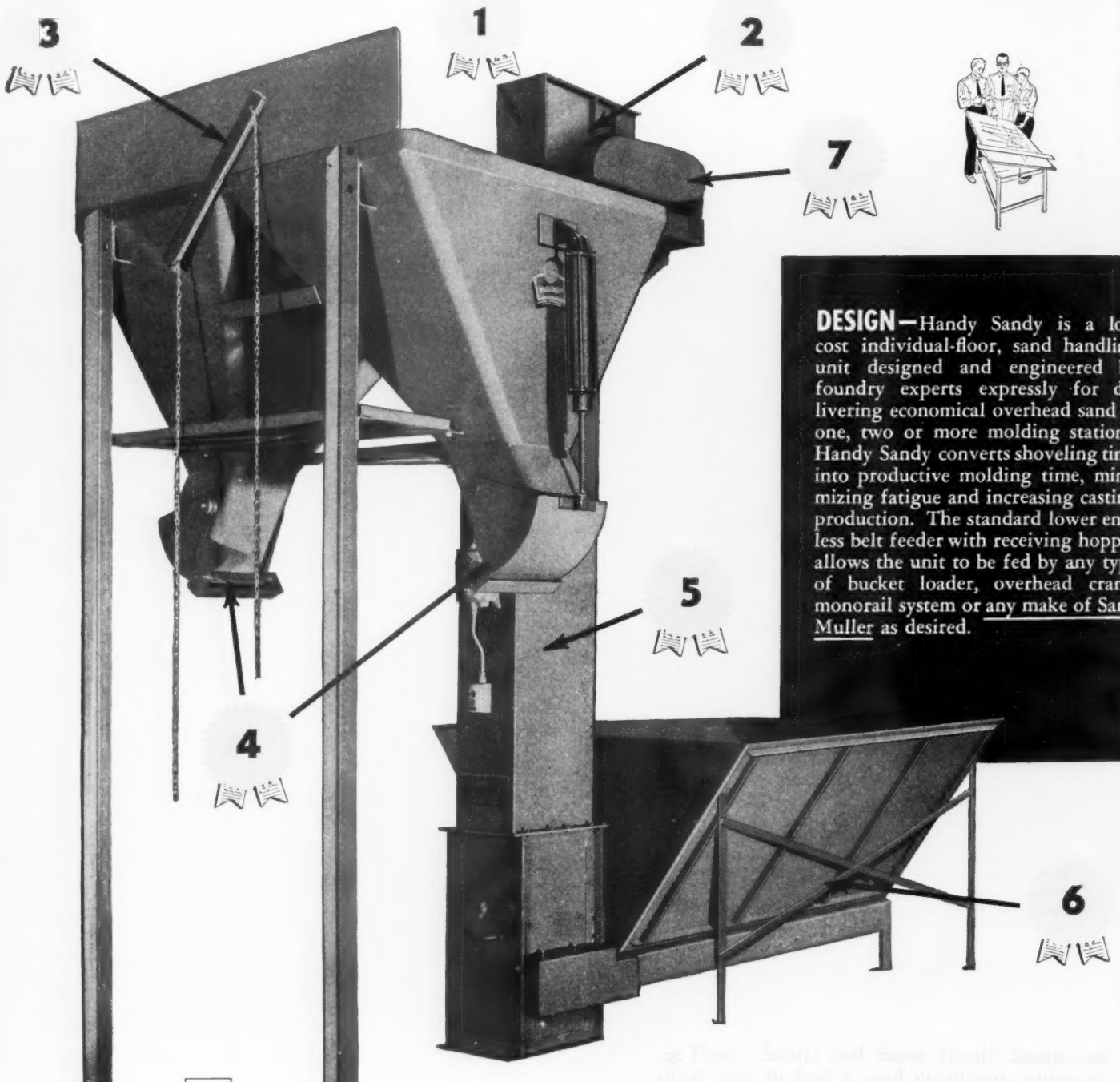


INSTALLS VACUUM FURNACE: A vacuum furnace with ferrous metal capacity of 50 lb has gone into operation at Armour Research Foundation of Illinois Institute of Technology. The vacuum melting process enables metallurgists to produce metal free of impurities which normally occur in air-melted ingots

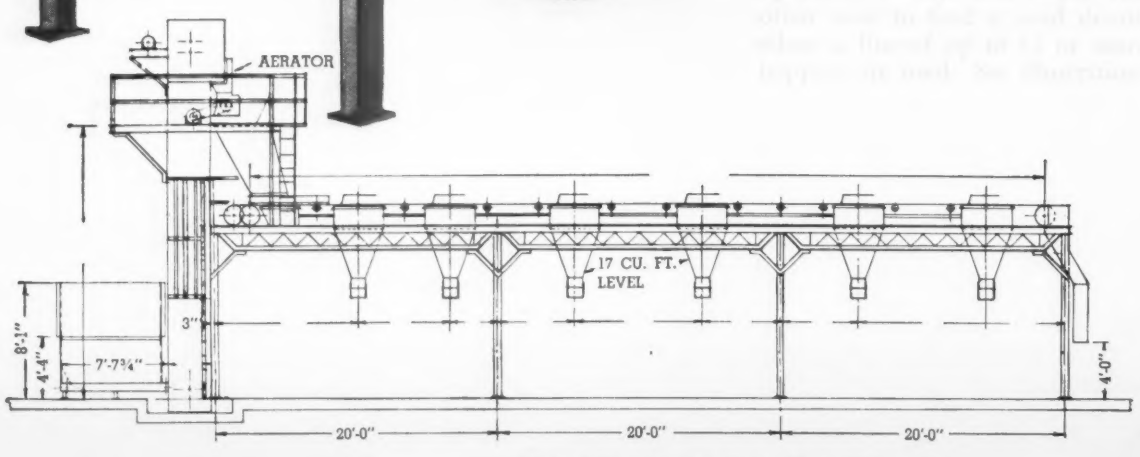
DUAL CELEBRATION: Ross Operating Valve Co., Detroit, celebrated two events during September—35 years of growth and the building of its 1 millionth valve, which was gold-plated for displaying. Jack Rowe, vice president of Ross, shows the gold-plated valve to R. J. Cameron, president of the company

HERE'S WHY 1,000 HANDY SANDYS

are proving their value in foundries everywhere



DESIGN—Handy Sandy is a low cost individual-floor, sand handling unit designed and engineered by foundry experts expressly for delivering economical overhead sand to one, two or more molding stations. Handy Sandy converts shoveling time into productive molding time, minimizing fatigue and increasing casting production. The standard lower endless belt feeder with receiving hopper allows the unit to be fed by any type of bucket loader, overhead crane, monorail system or any make of Sand Muller as desired.



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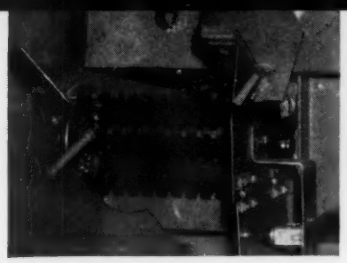


SEPARATE BUILT-IN AERATOR

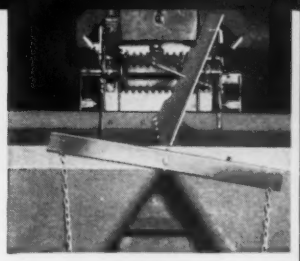
With separate drive at the head of the elevator actually cuts, blends and spreads sand as it is discharged into the overhead hoppers. Handy Sandy does not depend on a high-speed elevator discharge to "throw" sand into the hopper. Separate aeration is also maintained when Handy Sandy is used with a distributing belt to feed a series of hoppers in line.*

2

AUTOMATIC SAND SHUTOFF

This automatic shutoff prevents overloading in overhead hoppers. Sand elevator and feeder stop automatically when sand reaches a predetermined level in the overhead hopper. The molder simply starts the machine which operates until hoppers are full, then automatically shuts off. Automatic starting control available as optional equipment.

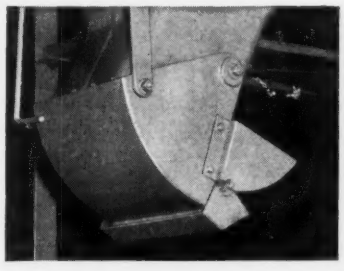
3



SAND VOLUME EQUALIZER

On the twin hopper Handy Sandys the Newaygo engineered sand volume equalizer proportions the amount of sand going into each hopper. Sand is easily controlled by the operator to compensate for unequal hopper requirements.

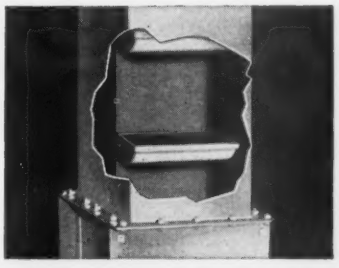
4



DRIBBLE GATES

Another Newaygo engineered development. The overhead dribble gate seals tightly when closed and prevents sand particles from dropping into the prepared mold.

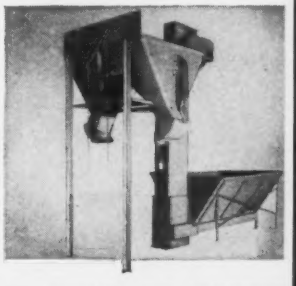
5



BUCKET ELEVATORS

Feature full width, heavy duty belts supporting a series of cast buckets. Also available with heavy duty chain belt. Elevator runs at moderate speed. This means less power requirement and keeps maintenance at a minimum. Elevator head and boot are designed with quick opening access doors to all moving parts.

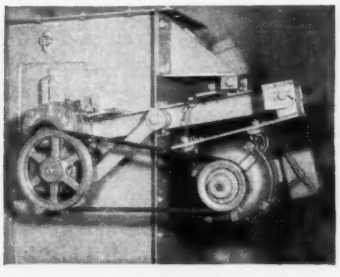
6



LOWER SAND STORAGE HOPPER WITH ENDLESS BELT FEEDER TO ELEVATOR BOOT

Standard Handy Sandys have a capacity of 8 to 10 tons of sand per hour. The lower feed hopper can be supplied with storage capacity up to 12 tons of sand. Super Handy Sandys have sand capacities up to 40 tons per hour.

7



AUTOMATIC ELEVATOR TAKEUPS

Air operated and 100% automatic. Assures positive alignment of head shaft at all times and controlled tension on the elevator belt or chain, speed reducer and aerator V-belt drives, without manual attention.

8

FLEXIBILITY

The unlimited variations in floor arrangements, hopper sizes and shapes have resulted in the successful use of Handy Sandys on molding floors in large and small foundries. No pits or foundations are necessary. Other applications include feeding core and mold blowers, shell molding machines and sand mullers.

9

LESS HEADROOM

The overall height of the Standard Handy Sandy is 13′ 1⅛″. This is several feet less than other makes, and is an important consideration in foundries with limited headroom.

10

EIGHT STANDARD MODELS TO CHOOSE FROM

Model No.	Type of Hopper Station	Type of Outlet	No. of. Outlets
HS-4-G	Single	Single Leaf	1
HS-4-D	Single	Hand Pull Out	1
HS-4-GT	Double	Single Leaf	2
HS-4-DT	Double	Hand Pull Out	2
HS-7-G	Single	Single Leaf	1
HS-7-D	Single	Hand Pull Out	1
HS-7-GT	Double	Single Leaf	2
HS-7-DT	Double	Hand Pull Out	2

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32 pages of information and specifications on the complete line of Newaygo Sand Handling, Mold Handling and Mold Making Equipment

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Fig. 1—Use of lift truck to move cupola droppings and slag has saved labor and freed other equipment

Fig. 2—Lift truck moves flasks weighing as much as 400 lb from storehouse to molding room and back

Lift Trucks Are Versatile in

Handling Foundry Materials

FREE-WHEELING imagination greatly expands the number and variety of tasks lift trucks can perform in the foundry. The utility of these already versatile pieces of material handling equipment is enhanced by the many attachments and accessories available.

From receiving through the foundry operations and shipping, efficient use of lift trucks frees men for productive activities and speeds and controls the movement of materials. In addition, trucks perform hazardous operations safely.

Fig. 3—Special lift truck is only handling equipment used to anneal skid of hot castings

In the receiving department of one midwestern foundry, only a lift truck is used for freight car unloading of sand, bonding clay, machinery, refractory brick and other materials. Using its fork truck and some tote boxes, the firm has reduced by 90 per cent the boxcar-unloading time required by its previous system of unloading refractory brick. The truck also is used to handle other bulk material.

Another midwestern aluminum and brass foundry receives its aluminum ingot from the supplier banded in unit loads—about 55 ingots per unit. This type of packaging permits handling by fork truck, shown in Fig. 5, through the entire cycle of unloading—from truck or freight car, into and out of storage and for delivery to the melting room.

Foundries that lack facilities for unloading rail shipments of bulk materials still can realize the advantages of freight-car-lot purchasing of bulk materials such as sand, coke and clay through use of a scoop attachment on a truck, as in Fig. 9. An Ohio foundry, for example, had been purchasing its molding sand in dump-truck lots at $14.50 per ton. The firm obtained a scoop attachment to unload freight cars and loaded its own dump-truck at the railroad yards. The cost of sand was reduced to $6.50 per ton. Cost of operating the lift truck and the dump truck and of paying operators of both units amounts to $1 per ton. The company figures the over-all saving to be about $7 per ton on molding sand.

In order to realize full productive capacity of its three cupola furnaces, a Tennessee foundry uses two 10,000-lb, low-lift trucks to move charges to cupolas. Fig. 4 shows one of these trucks in operation. The raw material needed by the cupolas is made up into charges of predetermined weight in a weighing hopper. Total weights of material carried by the truck are 5000 lb of mixed pig and scrap iron, about 700 lb of coke and dolomite, and about 2000 lb for the skid and charge bucket. One truck makes 100 material delivery trips in three hours.

Handling of silica sand inside the foundry also can be assigned to a fork truck. For this work a scoop attachment is kept in an easily accessible place. In a few minutes, the

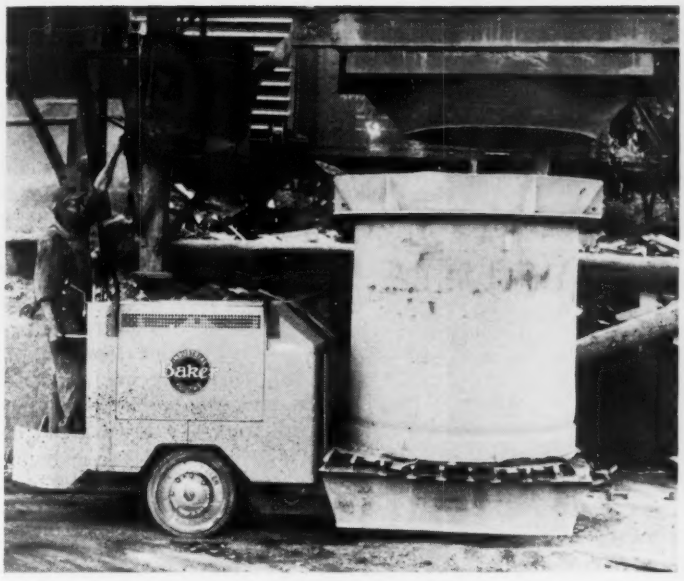

Fig. 4—At Tennessee foundry, two 10,000-lb lift trucks are used, as shown, to move 5000-lb charges to cupolas

Fig. 5—Banded unit loads of aluminum ingot move by lift truck from reception area to storage space

operator can change from forks to scoop. In one foundry, sand arrives in bulk and is dumped into a basement area, then conveyed to an overhead bin. As needed, it is fed through a chute into the scoop attached to the fork truck. The truck carries the sand through a small storage area near the sand muller—see Fig. 10—where the sand then is dumped for manual handling as needed into the muller.

Demands for increased production in the foundry often create a serious shortage of storage space for cores, castings and flasks. One plant faced with the problem of core storage created its own system. A rack-type handling system for cores was devised by company engineers with metal racks that could be handled by either lift truck or crane. Racks are 90 in. long and are fitted both with hooks for crane handling and with legs to permit entrance of a platform truck from beneath, as illustrated in Fig. 7. One, two and three-shelf units are provided to accommodate a wide variety of cores. Stationary storage racks were installed in the coreroom to permit double tiering, increasing storage space another 100 per cent.

In many foundries it still is common practice to handle small castings in nonstacking pans or steel barrels by means of a hand truck. If castings are dropped into steel drop-bottom or roll-over boxes, however, a lift truck can pick up a box, carry it to overhead feed hoppers or other storage arrangements, dump castings and return the empty box.

The assignment of a fork truck

Fig. 6—Carefully nested tank treads (on truck) and crankshafts (lower left) are transported as unit loads on truck. Loads are ready to ship

Fig. 7—Metal racks simplify problem of core storage. The 90-in. racks can be handled by either crane or lift truck and can be double tiered

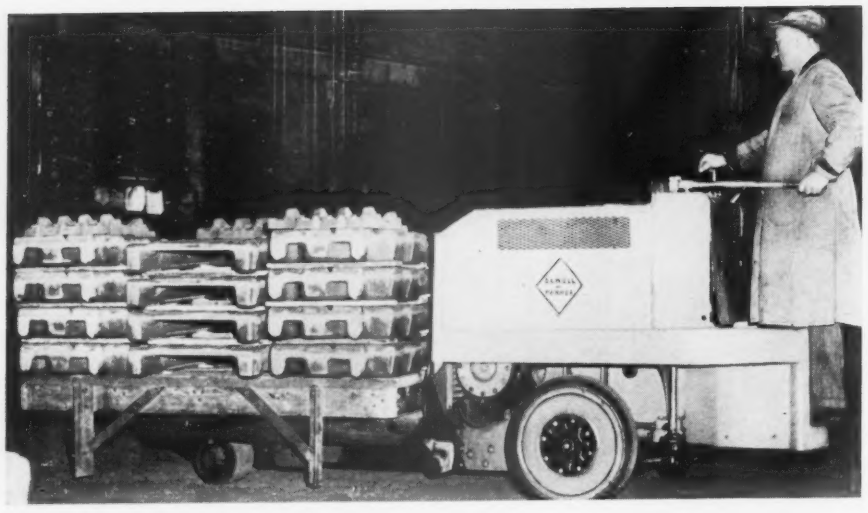

Fig. 8—Lift trucks move boiler section cores into core ovens in which temperature is 400°F. Cured cores are moved to molding section by truck

Fig. 9—Foundries without facilities for unloading rail shipments of a bulk material like sand can unload freight cars with a scoop attachment

Fig. 10—Sand handling inside foundry can be done by lift truck. This truck delivers about 130 cu ft of sand per day to area near sand muller

to handling and storage of flasks has increased considerably the efficiency of what once was a slow, costly, manual handling procedure for one foundry. The foundry uses some 50 sizes of flasks varying from 11 x 14 to 40 x 88 in. The flask weights vary from 50 to 400 lb. In the molding room, flasks no longer needed at the moment are stacked on pallets. When a pallet is full, a lift truck, Fig. 2, carries it to the storehouse. Selective storage racks, three pallet loads high, provide easy maneuvering for the truck, conserve floor space and put valuable air space to work. One lift truck spends two to four hours per day handling the flasks—formerly an all-day, manual labor job for two or three men.

A Canadian radiator manufacturer uses platform lift trucks in the core shop, where cores for radiator loops and boiler sections are made. Cores are placed on special racks, and the trucks move them into core ovens where the temperature is about 400° F. The trucks are in and out of the ovens many times a day. After baking, the cores are loaded onto skids and delivered to the pouring floor, Fig. 8.

Use Trucks in Heat Treating

Power lift trucks also can be put to excellent use in the heat treating operation. One foundry that makes steel castings ranging from 1 lb to a ton uses a fork truck, Fig. 3, as its only material handling equipment for the entire heat-treat cycle. A truck with special forks designed to lower loads below floor level is employed. Its job is to load and unload skid loads of castings from the heat-treat furnaces and to lower hot loads into the quench tank. The truck lowers loads into the tank, which is below the floor level, and holds them there on its forks for the required time. After the quenching, the skids loaded with castings are transported to another furnace for further treating or to storage.

Use of a power lift truck eliminates dangerous manual handling, and only the truck operator is needed to do the whole job. Processing time is greatly reduced because products need not be transferred from one handling device to another during heat treating.

Another useful assignment for a fork truck is to transfer molding machines from storage to the molding room. Although molding machines usually are heavy and awkward to move, they may be picked up and transported swiftly with a fork truck.

The lift truck can also be made to

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Versatile: Addition of Graphidox No. 4 renders an iron compounded for very heavy sections, suitable for light section work.

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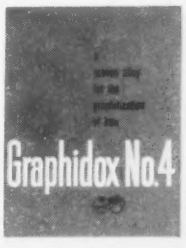

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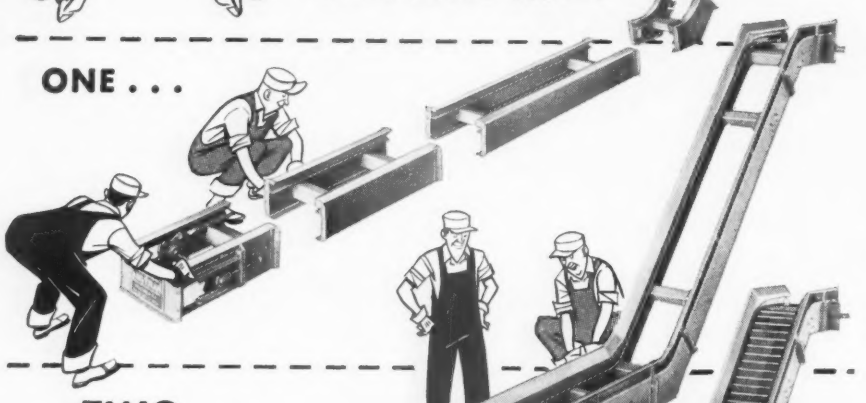

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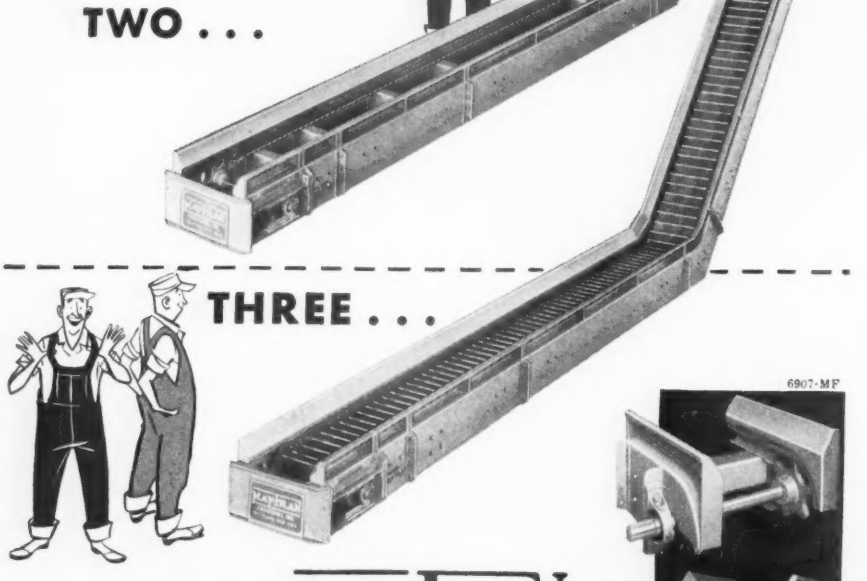

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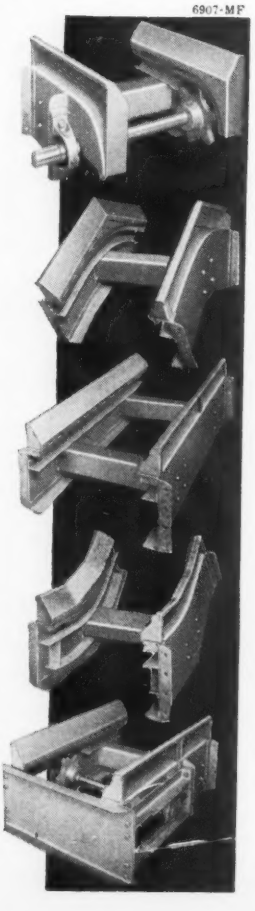

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double as clean-up man as shown in Fig. 1. At a Chicago foundry, a truck is used to collect slag, used sand and similar waste and to load these materials into gondola cars. Installation of this system has eliminated much manual labor and freed other equipment for work elsewhere. other equipment for important work elsewhere.

The problem of transporting castings of varied and irregular shapes often is solved through inexpensive, homemade arrangements which provide pallet-type unit loads easily handled by fork trucks. A Michigan foundry uses strips of wood and steel strappings, Fig. 6. With care in nesting the castings, the technique makes a stable load.

In another case, castings for automotive engines simply were dumped into railroad cars at the foundry. This practice caused inaccurate inventories, and the loose shipment meant high freight rates. The firm cut transportation costs in half by placing each class of castings in special skid boxes at the foundry. When the skids arrive at the assembly plant, they again are picked up by lift truck and are either double stacked for storage or taken directly to the first operation.

In addition to lowering costs, increasing production and furthering service to customers, thoughtful use of power lift trucks in foundry operations contributes to making the foundry a more pleasant place in which to work.

Editor's Note: This material was prepared in co-operation with the Material Handling Institute Inc., One Gateway Center, Pittsburgh 22.

Publishes Safety Booklet

A new booklet designed to summarize its safety program for its employees has been published by Norton Co., Worcester 6, Mass. It discusses briefly the causes of accidents and how the company's safety program operates to eliminate hazards. It also explains the responsibilities of employees in reducing accidents and solicits their assistance in keeping the company "A safe place in which to work."

Such subjects are covered as available protective equipment, machine guards, signs, safety rules, safety glasses, use of ladders, safety shoes, electric truck operation, fires, use of handrails, plant housekeeping and the cost of accidents to both individuals and the company.

A limited number of copies are available to those interested in preparing a similar booklet within their own companies.

Now, RCI offers a cold setting core binder

New FOUNDREZ 7200 eliminates many production headaches, even with the largest cores!

RCI, working with foundry experts at the company's Swiss affiliate, has now developed a cold setting organic core binder, known as OL-COROVIT. You can order it as FOUNDREZ 7200.

FOUNDREZ 7200 solidifies in the core box at room temperature. This means you can handle even the largest cores routinely. In addition, an easily controlled accelerator gives short setting times, and lets you regulate setting time to your production requirements. FOUNDREZ 7200 not only makes green strength unimportant, but also eliminates core distortion during baking.

Baking time required for cores bonded with FOUNDREZ 7200 runs half or less than half that required when you use conventional binders.

Physical Properties of FOUNDREZ 7200

FOUNDREZ 7200 consists of:

1. A specially modified drying oil with these properties:

Average Viscosity	Z_2-Z_4
Non-Volatile	100%
Lbs./Gal.	7.85
Color	Dark

2. FOUNDREZ 7200-A accelerator

This new RCI core binder can be stored indefinitely in closed, well-filled containers. Also important to production, FOUNDREZ 7200 binder is *absolutely non-toxic*. It causes no reaction on the skin, even after long contact.

Extra Advantages with FOUNDREZ 7200

1. **Air-drying of sand** is all that's needed when you use FOUNDREZ 7200 core binder.
2. **Excellent flow properties** of FOUNDREZ 7200 sand mixes mean you can cut down sharply on the amount of ramming when you fill a core box.
3. **Fewer core arbors and rods** are needed when you use FOUNDREZ 7200 binder.
4. **No bedding sand or dryers** are required during baking of cores.
5. **Almost no gas or smoke** is emitted on pouring.
6. **Easy shake-out** is achieved every time, because FOUNDREZ 7200 burns away readily.
7. **Less time and labor** are needed. You cut the work involved in making large cores to about 20% of that required with conventional core mixes when you use the new FOUNDREZ 7200.

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Circle 666 on Inquiry Card—Page 255

MANAGEMENT—EMPLOYEE

Relationships Discussed at 58th Annual NFA Meeting

THE fifty-eighth annual meeting of the National Foundry Association held at the Sheraton-Cadillac Hotel, Detroit, Oct. 10-12, featured an excellent program on various phases of management-employee relationships.

In opening the meeting, Paul L. Arnold, president of the association, and resident manager, United States Pipe & Foundry Co., Chattanooga, Tenn., outlined the activities of the past year. He discussed the changes made in dues structure, the expanded over-all program in the industrial relations field, and the various activities dealing with management problems. Mr. Arnold stated a New York office would be opened shortly.

A United Front—Arthur G. Hall, NFA vice president and works manager, Nordberg Mfg. Co., Milwaukee, told the members that a united labor front requires a strong, united foundry front. He traced the background of the labor merger and indicated its effect on negotiations. The 1956 negotiations were rough because the labor team was better prepared. Unions were willing to accept two or three year contracts in order to get time to solve the internal problems accompanying the merger, according to Mr. Hall.

Employee Communications—Dr. Paul J. Mundie, of Humber, Mundie and McClary, Milwaukee, presented an interesting talk on "Developing Effective Employee Communications." Dr. Mundie stressed the importance of starting any improvement program by getting better communications at the top. He asked how a man at the lower level of management can tell workers what is wanted when he does not know what top management wants. Therefore, start any program by teaching executives how to communicate.

The speaker stressed the importance of learning to read better, of learning to listen, of learning to do only those things that should be done by top management, of learning to make talks to employees and to groups in the community and of having a house organ which has a purpose. Dr. Mundie concluded with the thought that if you are going to give people information, give it to them at once, in language they can understand, without holding back part of the details. But you cannot give such information if you do not do it yourself.

Foremen and Stewards—Management has the responsibility of directly training foremen and indirectly training union stewards to work together. That was the conclusion of a panel discussion on the steward-foreman relationship.

Panel member E. S. Mathiesen, assistant works manager, Cutler-Hammer Inc., Milwaukee, suggests eight qualities for foremen which can be sharpened by company training.

"A foreman must be proficient in giving facts, must understand compromise and concession, avoid unnecessary conflicts and develop co-operation. He also has to recognize sore spots, be a good listener, learn to live with the stewards and he must know the company rules and the labor contracts," Mr. Mathiesen said.

"Stewards are not smarter than foremen; they're just better trained," emphasized Harry J. Kelley, another panel member. Mr. Kelley is industrial relations director, American Seating Co., Grand Rapids, Mich. Train foremen to anticipate employee needs and stewards won't have much to do. Foremen will gain confidence, he added.

Other panel members were: Ray F. Heiden, treasurer, Galva Foundry Co., Galva, Ill. (moderator); N. T. Booth, president, Deemer Steel Casting Co., New Castle, Del., and R. L. Jackson, executive vice president, Jackson Industries Inc., Birmingham.

Business Outlook—"A distinct business downturn, sharper than any since World War II, is likely sometime within the next year or two, even though the long-term economic outlook is extremely strong," warned Dr. John K. Langum, economist and former vice president of the Federal Reserve Bank of Chicago, at a luncheon session.

"To say we're going to have a great growth over the years is not the same as saying we're going to have great growth every year," he explained. For the short run, Dr. Langum reported that National Industrial Conference Board studies show capital expenditures approved in the first half of 1956 (for 1000 major companies) should insure good business through the first half of next year.

Communications — Communications can play a vital role in helping industry realize the economic value in good human relationships, Dr. George D. Heaton told the NFA. Dr. Heaton, a well known speaker on personnel and industrial relations, is minister of the Myers Park Baptist Church, Charlotte, N. C.

"The primary responsibility of management in communications is to know the real needs of its people and to make intelligent efforts to meet them," he declared.

"By giving employees recognition, understanding and participation, management will be better able to prove that person-centered supervision will outproduce in quality, quantity and cost, supervision which is production-centered," he added.

"The one common goal of employer and employee is to achieve maximum values from daily work so it becomes more than a punishing drudgery to be endured."

Trust Plan Approved—A commingled trust fund plan was approved by the association. The plan was developed for the NFA by Joseph H. Daoust & Associates, Detroit.

It permits member companies to set up individual low-cost pension plans and pool all contributions in the NFA trust fund to get a bigger return on investments. It has the following basic provisions:

1. Each company may adopt its own type of pension plan.
2. Each company will pay its own costs.
3. Companies can skip or reduce contributions in low profit years if previous contributions have been above minimum.
4. Companies will get maximum interest return by merging all funds into a common investment pool.
5. One actuary (Daoust & Associates) will handle administrative procedures for all members in order to save individual administration costs.
6. The trust fund plan also will reduce the cost of initially setting up

a pension plan for each company.

Officers Re-elected—All officers of the association were re-elected for another term and the following were elected to the administrative council for three-year terms:

Edward Denz, Murray Iron Works, Burlington, Iowa; C. A. Carolin, Carolin Foundry & Machine Co., Detroit; Clyde Hagler, Continental Gin Co., Birmingham; John Meyers Jr., Morris Machine Works, Baldwinsville, N. Y.; A. Lysle Dyer, Buckeye Foundry Co., Cincinnati, O.

Other new council members are: Warren Brown, Florence Pipe Foundry & Machine Co., Florence, N. J., and Andrew Jencks, J. S. White Co., Pawtucket, R. I.

The Alumni banquet Wednesday evening featured the awarding of life memberships to George W. Cannon, I. R. Wagner, Harry E. Ladwig and L. P. Robinson. A 50-year membership plaque was presented the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Northeastern Ohio AFS Chapter Schedules Extensive Program

The Educational Committee of the Northeastern Ohio Chapter of the AFS is undertaking the promotion of an ambitious program to supplement the technical discussions provided during the course of the year at the chapter's regular meetings.

A series of vocational guidance talks before high schools in the Cleveland area is underway in an effort to stimulate thinking about the foundry industry.

A television program will be presented on Feb. 10 over station KYW-TV, Cleveland, as one of a series of programs sponsored by the Joint Engineering Societies Council portraying various industries in Cleveland. The theme of the program will be light metal founding.

A technical symposium on gating and risering will be given on Jan. 8, 15, 22 and 29, at Case Institute of Technology. Prof. Jack F. Wallace, Case Institute of Technology, will discuss gating theory and risering theory at the first and third meetings. Karl G. Presser, director of quality control, Forest City Foundries Co., will lead the discussion on gating practice at the second meeting. Charles Walton, technical director, Gray Iron Founders' Society, will head the discussion of risering practice at the fourth meeting. A panel representing both ferrous and nonferrous metals will attend each session and answer questions presented.

The well known Harry W. Dietert Sand School will be in session at Case Institute of Technology on March 19-21 from 9:00 a.m. to 4:00 p.m.

ASTM Publication Discusses Effect of Impact and Shock

The effect of impact and shock on various materials is the subject of American Society for Testing Materials Special Technical Publication No. 176, which contains 14 papers. These papers include nine which cover impact and shock tests for parts, components and complete structures and five others appropriate to the subject.

Such innovations as the impact tube are discussed, and environmental conditions, particularly temperatures, are considered. The broad outlook is taken, so as to enhance the practical application of this type of work. The book contains many graphs, charts and photographs and several bibliographies. Copies may be obtained from the ASTM, 1916 Race St., Philadelphia 3, Pa., for $3.50 each.

Now in operation, this new production foundry is operating continuously over two 8 hour shifts, employs 2,000 workers and is pouring 1000 tons of gray iron every 16 hours. Cores and molds are baked and dried in Despatch Ovens.

DESPATCH OVEN FEATURES

Increased Production—100% convection heat and up to 75% recirculated air give speedy warm up, fast heat recovery after reloading and fast baking.

Quality Baking—Heavy duty, high volume fans give speedy heat transfer, assure uniform baking.

Approved Control—Despatch ovens are equipped with automatic temperature controls and fire underwriter approved safety systems.

Efficient Operation—Direct gas or oil fired heaters cut fuel costs . . . for more information about Despatch Foundry Ovens . . .

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DESPATCH OVEN COMPANY

PIONEERS IN ENGINEERING HEAT APPLICATIONS FOR INDUSTRY

Circle 667 on Inquiry Card—Page 255

Speakers at the SFSA fall meeting included, left to right: E. C. Huebner, Safety Committee chairman; Charles W. Briggs, technical and research director; Howard F. Park Jr., president; F. Kermit Donaldson, executive vice president, and Allen M. Slichter, chairman of the Market Research Committee

Market Research Pushed by

STEEL FOUNDERS' SOCIETY

By WILLIAM G. GUDE
Managing Editor

MARKET research received the principal attention in discussions at the 54th fall meeting of the Steel Founders' Society of America. Held at the Greenbrier, White Sulphur Springs, W. Va., Sept. 24-25, the meeting was attended by about 180 representatives of member companies.

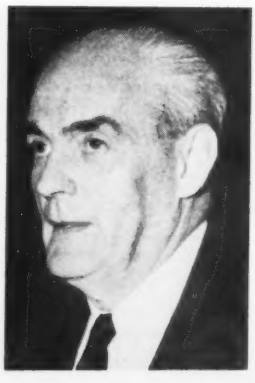
Society president Howard F. Park Jr., vice president-sales, General Steel Castings Corp., Granite City, Ill., opened the program with a brief report on some of the organization's more important activities. He cited, in particular, the SFSA market research program launched a year ago, technical research work and the enlarged product development contest.

The present contest, with $6300 in prizes, was described by Mr. Park as a helpful tool in expanding steel casting use and in improving customer relations. He also called attention to the 11th Technical & Operating Conference, to be held at the Carter Hotel, Cleveland, Nov. 7-9.

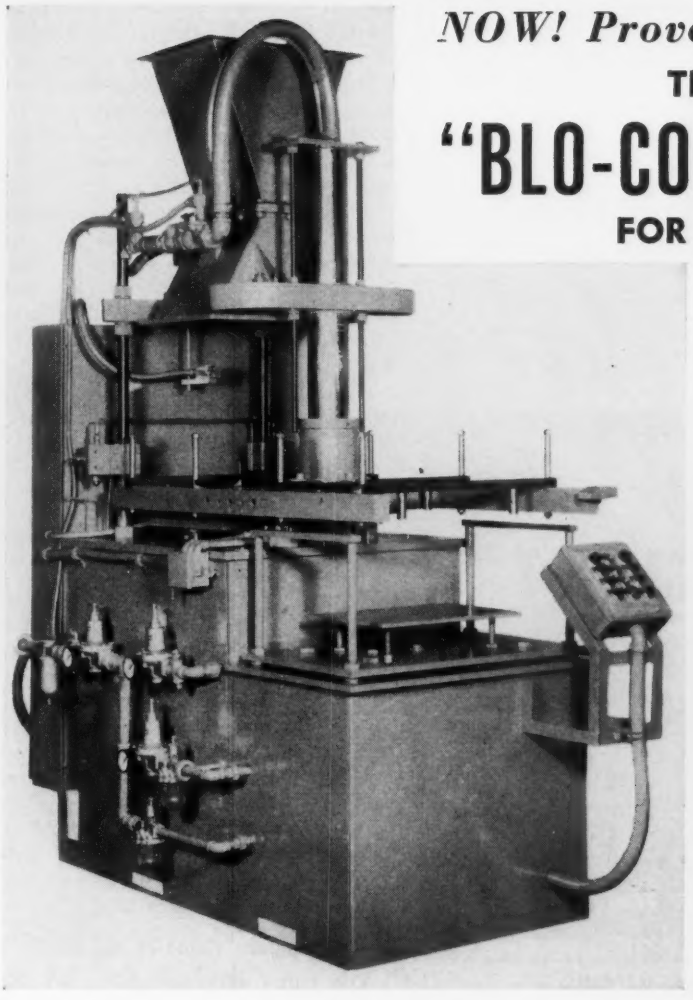
Foundries should not rely on the fine print of their quotation and order acceptance sheets to give them blanket protection on terms and conditions of sale. This warning was given by Chauncey Belknap, society legal counsel. He pointed out how such supposed safeguards can be negated by fine print overlooked on the customer's order. The wisest course, he said, is to have a clear, written agreement with the buyer beforehand to cover possible contingencies such as adjustment procedure for defective pieces in a shipment.

Steel foundries in England and the Continent are operating at capacity with heavy backlogs, and many of them are expanding their facilities, according to Charles W. Briggs, SFSA technical and research director.

Mr. Briggs, a speaker at the 1956 International Foundry Congress in Dusseldorf, Germany, returned recently from a visit to European foundries. He reported that steel casting classifications of producers abroad are similar to those of U. S. foundries, with a trend noted toward



Guest speakers at the meeting were Kenneth Lindsay, at left, Iowa Mfg. Co., and Fred W. Manley, right, Minnesota Mining & Mfg. Co.



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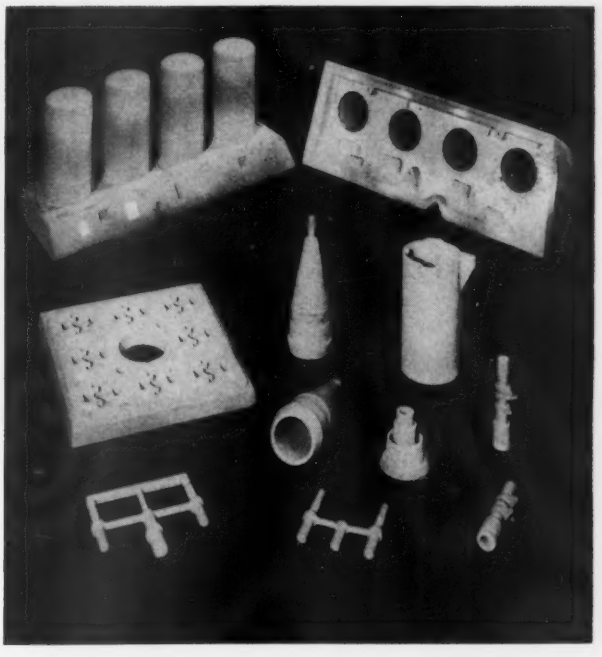
SHELL CORES and SHELL MOLDS



Check the outstanding features of this "BLO-CORE" SHELL MACHINE:

- ☑ Core Boxes up to 15" x 20" x 30" high.
- ☑ Mold Boxes up to 16" x 22" x 14" draw.
- ☑ Horizontally-split Mold or Core Boxes.
- ☑ 4-Part Draw Split Core Boxes.
- ☑ Vertically-split Core Boxes.
- ☑ Two Station Rotary Operation.
- ☑ Electrically Heated Boxes. NO OVENS.

Take advantage of our complete engineering services for proving blown shells. Send us your print or sample core and we will gladly explain in detail our complete facilities for getting you into shell blowing with proven boxes on a proven machine. We provide you with samples to prove out the job to your satisfaction before purchase of a machine.

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Circle 668 on Inquiry Card—Page 255

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Norgren OIL-FOG Lubricators are reducing down-time in foundries everywhere by providing better lubrication for air operated equipment. OIL-FOG, conveyed through air lines, automatically provides a continuous coating of lubricant, reducing wear and preventing rust. Check the trouble spots on your own air-operated equipment—lubrication is often the problem and Norgren OIL-FOG may be your answer.

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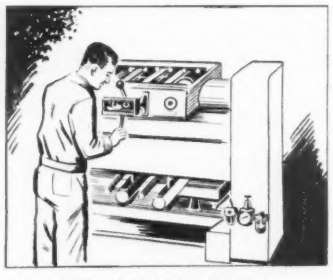
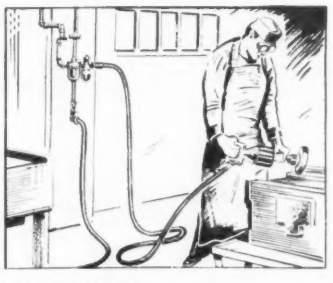


FOR CORE BLOWING MACHINES



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How Norgren OIL-FOG Cuts Foundry Costs:

1. Ends sticking of cylinders on molding machines—decreases down-time, boosts output.
2. Reduces wear on air-operated components of core drawing machines and other foundry equipment served by air.
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For complete information about OIL-FOG Lubrication for air-operated foundry equipment, call your nearby Norgren Representative listed in your telephone directory — or

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the development of higher strengths.

Higher quality is the major goal of European steel foundries, Mr. Briggs said. This aim is reflected in such things as the enlargement of technical staffs, universal use of immersion thermocouples for temperature measurement, and greater attention to gas analysis and radiographic testing. Although as-cast surface finish is relatively poor, European steel foundries invariably operate their own machine shops and feel that a machined part offers the best proof of quality.

Mr. Briggs also said that use of shell molding is expanding rapidly abroad—more so than that of the CO_2 process—although shell mold applications for carbon and low-alloy steel castings still are limited. Adoption of the core shooter is becoming widespread, particularly in Germany.

Discussing briefly the ferrous scrap situation, F. Kermit Donaldson, SFSA executive vice president, said that no action on limitation of exports is likely before next January. That is the date when a report on the Department of Commerce's survey of the nation's supply-demand relationship is due. Meanwhile, he said, exports are running ahead of their 1955 rate, and prices of the quality grades of scrap required by steel foundries are at record levels.

Emphasizes Value of Research

The value of research in developing new products was emphasized in a talk by Fred W. Manley, Minnesota Mining & Mfg. Co., St. Paul. In tracing the creation of various of that company's products, he pointed out the many indirect benefits which accrue in addition to those results sought directly.

Fundamental research is vitally important, Mr. Manley said, in the interest of both national security and industrial leadership. His company, the speaker added, spends the equivalent of 3½ per cent of its sales dollar on research and product development. It seeks to elicit ideas from all employees, avoids regimenting a researcher's time, and does not penalize the man whose idea turns sour.

High lights of the society's recently completed end-use survey were presented by Mr. Donaldson. This study, described as the most comprehensive analysis ever prepared of steel casting consumption, was compiled from data furnished by a large majority of the industry's foundries. It shows that 39.7 per cent of all steel castings shipped in 1950-1954 were for railroad use. Percentages accounted for by other leading consumers were as follows:

Rolling mills 8.6 per cent; power shovel and road building 8.5 per cent; ordnance 7.8 per cent; metalworking

Quality castings begin with truly uniform **PENN-SAND**

PENN-SAND products are supplied by the Pennsylvania Glass Sand Corporation, the nation's leading producer of quality silica sands since 1868. There is a grade of PENN-SAND ideally suited for every foundry application.

MOLDING SAND

CORE SAND

SHELL-MOLDING SAND

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PENN PGS SAND

THE SURE START TO A PERFECT FINISH

Triple washing, multiple screening and rigid testing *before* shipment assure the perfect uniformity of each grade of PENN-SAND—shipment after shipment.

By using truly uniform PENN-SAND, you can standardize your mixes. As a result, you save the time and money normally spent to change mixes every time a car of sand is received. Further, you will find your cleaning costs reduced and your production of scrap castings cut considerably.

Whether you use core oil, bentonite, one of the new cold-set resins, or the CO_2 process, there is a grade of PENN-SAND that will help you produce better castings at lower cost. For complete information and free samples, write to Pennsylvania Glass Sand Corporation, Two Gateway Center, Pittsburgh, Pa.

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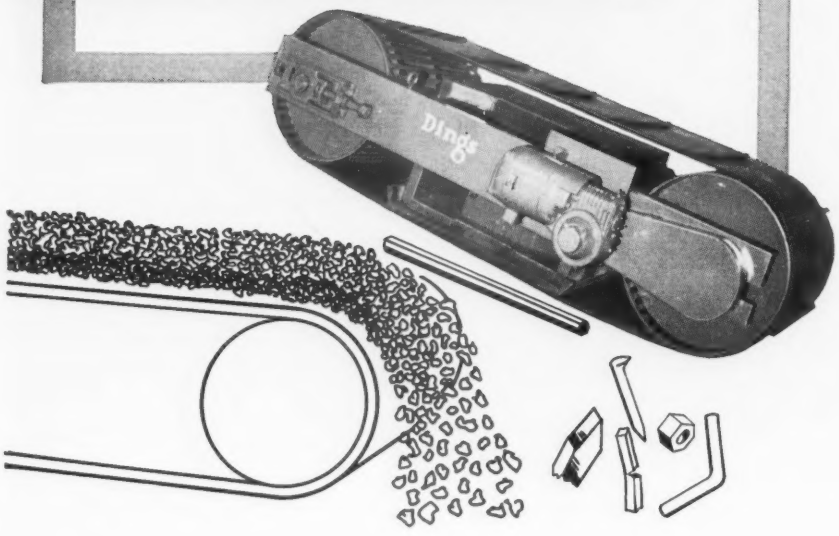
Circle 670 on Inquiry Card—Page 255

Reduce Production Delays . . .
Eliminate Tramp Iron Damage

USE DINGS "IN-LINE" RECTANGULAR MAGNETS



Here's the way Dings Self-Cleaning Suspended Magnets save money for you . . .

They protect costly machinery against tramp iron damage by pulling iron out of the deepest burdens on high-speed belts, where other types of magnets are ineffective.

Discharge is automatic and constant . . . no manual labor required for cleaning . . . no danger of accumulated iron dropping on the belt if power fails. There is no dribble, no carry-over, no interference with conveyor operation.

"In-Line" models extract iron parallel to burden travel and at the same speed. Rail sections or other long pieces are removed before the trailing edge can rip the belt.

Dings RM models . . . "In-Line" or across-the-belt . . . use less current, weigh less in proportion to strength, take little room, are ruggedly built for heavy-duty service.

Their high efficiency and superior design often makes it possible for a smaller RM unit to do a better iron removal job than a larger, more expensive magnet of a different type!

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Send the coupon for complete details about Dings Rectangular Magnets and other Dings units designed to meet your magnetic separation needs.

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and other machinery 7.3 per cent; valves, piping, fittings and pumps 6.2 per cent; mining, crushing 4.7 per cent; power equipment 4.5 per cent; automotive 4.5 per cent; agriculture 3.5 per cent; material handling 1.4 per cent; ship and marine 1.3 per cent; all other 2 per cent.

It is hoped that similar data can be compiled annually hereafter.

Information contained in this survey will provide the basis for market and product analyses and for forecasting future demands, it was explained by Allen M. Slichter, president, Pelton Steel Casting Co., Milwaukee, chairman of the Market Research Committee. The work of analyzing potential steel casting consumption in various leading markets is the next step in the committee's program. It will make use of considerable other information and statistics relative to the current and prospective growth trends of those consuming industries in charting market opportunities for steel castings.

Discusses Highway Program

America's new highway program, involving more than 40,000 miles of roads, will have a nation-wide economic impact, it was stated by Kenneth Lindsay, executive vice president, Iowa Mfg. Corp., Cedar Rapids, Iowa. Effects of the huge federal spending for new highways should begin to be felt in fiscal 1958, he said. By 1960, it is estimated, the program will provide employment for 900,000 people; the $8 billion to be spent that year will include the purchase of 3,672,000 tons of steel, 113 million barrels of cement and 662 million tons of stone, sand and gravel. The 13-year, $50-billion program is described as the greatest public works undertaking in the world's history.

The speaker indicated that steel casting requirements for road building equipment would increase about 70 per cent during the next two to three years, with the upturn reaching 100 to 150 per cent several years later.

Awards in the society's annual safety contest were presented at the meeting's closing luncheon by President Park and E. C. Huebner, chairman, SFSA Safety Committee and personnel manager, Wehr Steel Co., Milwaukee.

In discussing the steel casting industry's safety record as a whole, Mr. Huebner pointed to the marked improvement since 1943, when the frequency rate was 44.3. This was reduced to 16.2 in 1954. He added, however, that the upturn in production since then has been accompanied by a growing accident rate—18.0 in 1955 and in excess of 20 for the first half of 1956.

The society's contest this year dur-

Two Compartment Car Type Mold Drying Oven.
Two Compartment Rack Type Core Oven.
Single Compartment Rack Type Core Oven.
LANLY
FOUNDRY OVENS
THE LANLY COMPANY • 780 PROSPECT AVE
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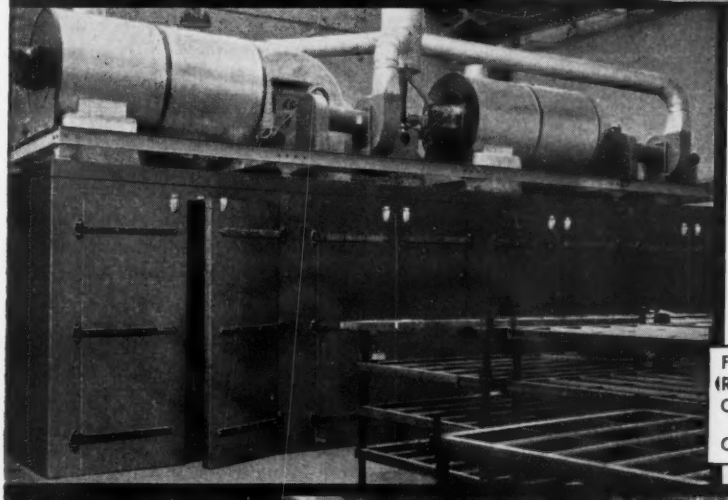
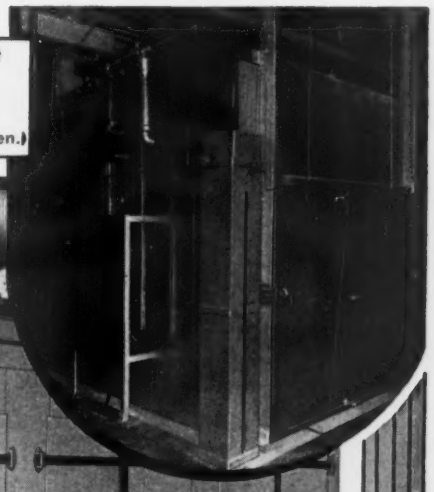
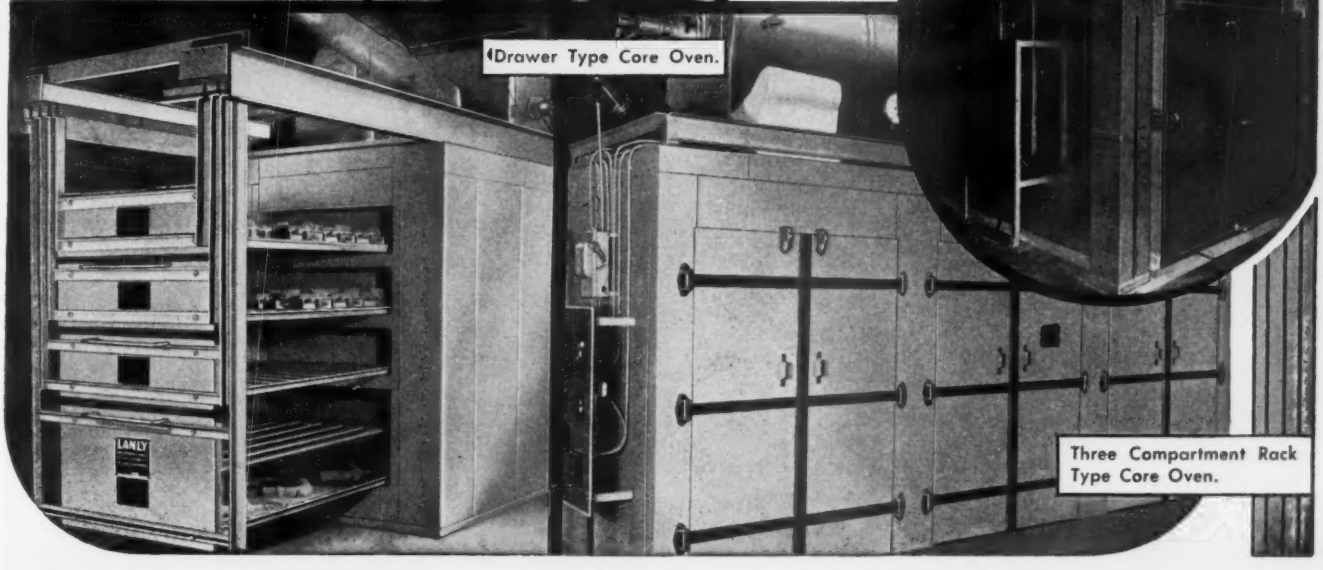


The Lanly reputation has been established as the result of the consistent incorporation of advanced, efficient design and high grade construction into every Lanly installation.

Core baking, pasting and mold drying ovens as well as casting conditioning and heat-treating ovens are available in standard units.

Write for Literature and Complete Information.





Logan Roller Conveyor in machine tool plant. Gate sections in foreground provide passageway through assembly line and step plates between rolls allow easy access for operators to work stations. Transfer car handles incoming sub-assemblies.

The LEADERS use Logan

Small business today . . . large business tomorrow. In this country we don't have to "stay put." Development and growth are characteristics of American industrial leaders. An important factor is the insistence on highly efficient material handling methods. Take Logan Conveyors. The nation's foremost industries use this equipment to step up production tempo, enlarge capacity, improve deliveries, conserve manpower. These are Logan functions which you, too, can use profitably. Write for nearest engineer or for further information.

LOGAN CO., 580 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

ing June, July and August had 140 participating foundries. They experienced 612 accidents during 28,-338,000 man hours. Highest honor awards went to 24 plants which had no lost-time accidents during the three months, and 23 companies received certificate awards for accident frequency rates of less than 10. The winners follow:

HIGHEST HONOR AWARDS

(Group No. 1, 1-30,000 Man-hours Exposure)

Calumet Steel Castings Corp., Hammond, Ind.; National Roll & Foundry Co., Avonmore, Pa.; Eastern Malleable Iron Co., Wilmington, Del.; Detroit Gray Iron Foundry Co., Detroit; Washington Iron Works, Seattle; Deemer Steel Casting Co., New Castle, Del.; Tonawanda Electric Steel Casting Corp., North Tonawanda, N. Y.; Pacific Car & Foundry Co., Renton, Wash.; Arneson Foundry Inc., Kenosha, Wis.; Pacific Alloy Engineering Corp., El Cajon, Calif.; McConway & Torley Corp., Pittsburgh, Pa.; Ross-Meehan Foundries Inc., Chattanooga, Tenn.; American Cast Iron Pipe Co. Birmingham; Hughes Tool Co., Houston, Tex.

(Group No. 2, 31-55 Thousand Man-hours Exposure)

Mackintosh-Hemphill Division, Midland, Pa.; Chapman Valve Mfg. Co., Indian Orchard, Mass.; Michigan-Standard Alloy Casting Co., Detroit; Hartford Electric Steel Corp., Hartford, Conn.; St. Louis Steel Casting Inc., St. Louis.

(Group No. 3, 56-100 Thousand Man-hours Exposure)

Continental Foundry & Machine Division, Corapolis, Pa.; Crucible Steel Co. of America, Harrison, N. J.; Penn Steel Castings Co., Chester, Pa.; Cooper Alloy Corp., Hillside, N. J.; United States Steel Corp., Johnstown, Pa.

(Group No. 4, 101,000 and Up Man-hours Exposure)

Duriron Co., Dayton, O. (had the lowest frequency rate for the contest months in this group of man-hours exposure, 2.3)

CERTIFICATE AWARDS

(Frequencies rates as indicated)

Continental Foundry & Machine Division, Wheeling, W. Va. (2.8); Oklahoma Steel Castings Division, Tulsa, Okla. (3.1); Crane Co., Chicago, (3.6); Dayton Steel Foundry Co., Dayton, O. (4.1); Wehr Steel Co., Milwaukee (4.3); Falk Corp., Milwaukee (4.3); Continental Foundry & Machine Division, East Chicago, Ind. (4.5); American Steel Foundries, East Chicago, Ind. (5.0); East Texas Steel Castings Co., Longview, Tex. (5.6); General Steel Castings Corp., Granite City, Ill. (6.0); National Malleable & Steel Castings Co., Sharon, Pa. (6.1); Burnside Steel Foundry Co., Chicago (6.6).

Sterling Steel Casting Co., Monsanto, Ill. (7.0); Empire Steel Castings Inc., Reading, Pa. (7.4); General Steel Castings Corp., Eddystone, Pa. (8.0); American Steel Foundries, Alliance, O. (8.2); Mountain State Steel Foundries Inc., Parkersburg, W. Va. (8.2); Dominion Foundries & Steel Ltd., Hamilton, Ont., Canada (8.3); Pittsburgh Steel Foundry Corp., Glassport, Pa. (9.2); Dodge Steel Co., Philadelphia (9.2); Minneapolis Electric Steel Castings Co., Minneapolis (9.3); Dibert, Bancroft & Ross Co. Ltd., New Orleans (9.6); National Malleable & Steel Castings Co., Cicero, Ill. (9.9).

"There goes our expert—in bronze."

THE NEW **CP SHELL SAND SPEEDMULLOR**

...makes resin-coated sands available to any shell molder

You can't afford to be without these advantages.

- ☆ Up to 50% saving in resin for equal strengths . . . maximum physical properties with resin contents of 3%.
- ☆ The cold process Shell Sand Speedmullor successfully coats any sand with any resin . . . maximum flexibility.
- ☆ Highest capacity per dollar of equipment expenditure or per square foot of floor area.
- ☆ Complete automatic control—Mulltrolmatic—insures uniformity . . . batch after batch and day after day.
- ☆ Cycle time is only a fraction of that required by any other equipment.
- ☆ Speedmullor coated sands solve all problems of resin segregation and completely eliminate the health and safety hazards of uncoated sands.

Send today for Bulletin No. 6000

THE WORLD'S LARGEST

EXCLUSIVE MANUFACTURER

OF FOUNDRY MACHINERY

BEARDSLEY AND PIPER
DIV. PETTIBONE MULLIKEN CORP.
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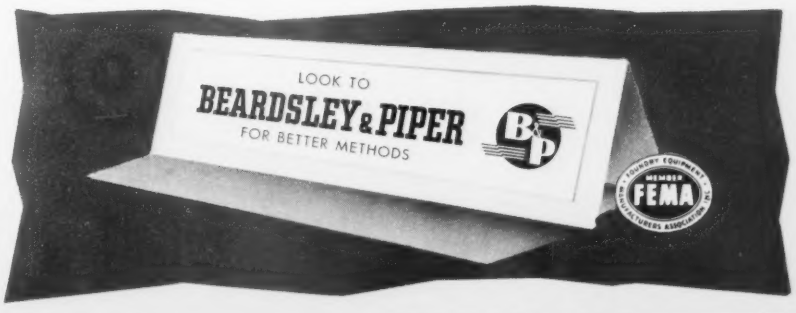


Fully mulled and conditioned sand with savings of $60 a day!

Now the advantages of fully controlled sand practice are available to really small foundries at a cost they can readily afford. This small iron shop has installed a Model '40-60' Speedmullor-Preparator Unit to fully prepare all of the sand for the foundry's nine molding floors.

The estimated saving is sixteen man hours a day on sand alone. Reduced cleaning time and lowered casting losses bring the total saving to 60 dollars a day. The first year's saving will more than pay the total cost of the entire unit including installation.

With machinery like this available, the small foundryman can't afford *not* to mechanize.

Bulletin No. 1230 will give full information.

B & P SPEEDMULLOR-PREPARATOR UNITS

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

FEMA

BEARDSLEY AND PIPER
DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue, Chicago 39, Ill.

Man to Man

RALPH L. LEE

"We'd all hate to see castings left out of new diversification programs just because we don't want to bother with peewee stuff"

Casting Publishers

BOSS Kettering, General Motor's beloved philosopher, inventor, friend and leader of research, frequently draws an analogy between publishing and the manufacturing business. He says that the layman as he walks down the conveyorized assembly line or the mechanized machining line during his visit to an automobile plant is not, as he thinks he is, seeing how motor cars are made. He is seeing only the tail-end of the process.

Like other visitors watching copies of our FOUNDRY or of newspapers whipping out of a mechanical monstrosity at an unbelievable rate, these visitors are seeing only copies being made of a motor car which was designed, engineered, tooled, patterned and process-planned in a most tedious, laborious and time-consuming fashion by an unbelievably large number of folks working behind the scenes.

In the light of Boss's point I had to think that visitors making the round trip of the loop in one of our production foundries also might get the wrong impression of what it really takes to make a casting—that is, starting from scratch.

Then, still using Boss Kett's analogy, it struck me that just as there's considerable difference between printing and publishing, there also might be a big difference between foundries. One takes almost anything in the way of a pattern plate handed it and whams out copies by the hundred. Then, on the other hand, some foundries carefully consider the peculiarities, interests, needs, capacities and welfare of the "subscribers" to their "casting publication" service.

Sticking to a Policy—Unlike the printer, this publisher of castings has an editorial policy to which everyone in the outfit sticks. Everybody takes pride in his copy, layouts and composition and in the appearance of the copies he turns out. They all are darned particular with any plate they set up, and there are certain items they simply will not publish.

I certainly do not want to go overboard with Boss Kett's analogy, but as a result of hobnobbing around with foundrymen on several chapter meeting trips lately, I get the feeling that the interest in the "printing" end of the casting publishing business—that is, the equipment end, its revolutions per minute and how nearly automatic it can be—is overshadowing interest in the needs of casting users.

One fellow I talked to was particularly gloomy over an epidemic of oldtime foundries folding up in his area. When I questioned him as to why, he couldn't tell me for sure, but he had the feeling that former customers of these outfits were swinging over to sheet metal fabrications or other substitutes for sand castings. When I asked him how about engineering castings—that is, small-lot, loose pattern work, model building, experimental production and such—he said that with the folding of these old foundries he didn't know where a person would go for this type of work.

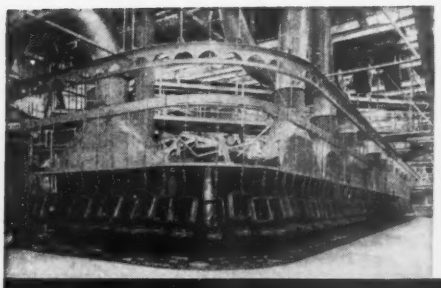
We'd better scan the lower production range of this expanding foundry market of ours for the one or dozen-or-more each items

Another fellow, a distinguished foundryman and a personal friend of mine, told me of the casting needs of several firms (and a sizable volume, too) going begging because their gated patterns did not fit in with the mechanized setup within reach—their only nearby sources, by the way.

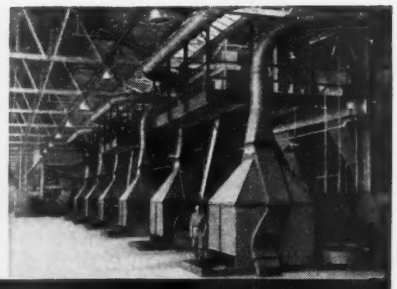
I don't know just how general this situation is, but I couldn't help think of the research and engineering expansion splurge which seems to be taking place all over the country. You can hardly pick up a technical or trade publication that isn't loaded with almost tearful pleas for engineering and technical talent of every kind and desecription, with the most enticing offers conceivable. Then, too, hardly a day goes by that we aren't astounded by some oldtime traditional pickle packer who is adding electronic gadgets to his line, or maybe arc welding units. Everybody and his uncle seems to be barging off into fields entirely foreign to his previous experience while carrying diversification to unheard-of extremes.

Castings Will Be Needed—What I'm trying to say, as a former experimental modelmaker, draftsman and designer, is that I can't for the life of me see how the reams and reams of "prints" being turned out by this great army of thinkeruppers can possibly take concrete form without involving one whale of a lot of castings. Somebody's got to make them.

Then there are all of the castings involved in these mechanization and automation programs, to say nothing of conventional tooling and machine tool building. I'm still harping on



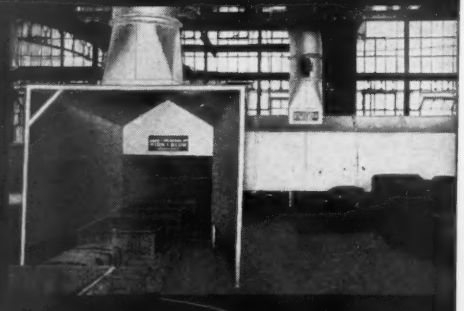
View in new Southern Foundry, shows pouring station with K & B system which removes smoke and fumes as they are formed.



"Shakeouts" in the foundry of a noted implement firm equipped with K & B Dust Control System.

1. DESIGN
2. FABRICATION
3. INSTALLATION

For all three . . . call K & B



K & B Plenum Chamber Hood for mold conveyor operation. Note bolted section construction for ease of maintenance.

For 50 years, Kirk & Blum has specialized in the DESIGN, FABRICATION and INSTALLATION of efficient, dependable systems for the removal of dust and fumes.

DESIGN: Kirk & Blum engineering specialists survey your plant and then design your system, selecting equipment most suitable for your problem.

CONSTRUCTION: Kirk & Blum fabricates the complete system (equipment excepted), "tailor made" for your installation.

INSTALLATION: The Kirk & Blum contract includes responsibility for the entire system, installed by mechanics with years of specialized experience in the installation of such systems. As a result, you have one undivided responsibility—one complete contract for an installed system, ready to operate.

FOR CLEAN AIR . . . THE INVISIBLE TOOL

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DUST AND FUME CONTROL SYSTEMS

The Kirk & Blum Mfg. Company, 3239 Forrer Street, Cincinnati 9, Ohio

Boss Kett's publishing analogy, with the implication that we may become so thoroughly occupied with speeding up our automatic copying presses that we lose sight of a whale of a lot of reading matter of a type, in spasmodic quantities, which our modern miracle workers can't touch with a 10-foot pole.

Automobiles weren't always made at the rate of thousands per day. Neither were vacuum cleaners, household refrigerators and many other tremendous-volume articles we are accustomed to take for granted. They started out in life as experimental, hand-made models, and although some died on the vine, many thrived, bred and multiplied at ever-increasing rates.

I think we'd all hate to see castings left out of these new diversification programs just because we don't want to piddle around with peewee stuff, thus making castings in odd lots too hard to get.

Again the old amateur sticks his neck out in a field where angels fear to tread, but just the same I still think we'd better take a shot at the stars to get our bearings, whither are we drifting and all that sort of thing. We'd better scan the lower production range of this expanding foundry market of ours for the one-each, or a dozen-or-more-each items with the love glint in their eye, the mating call on their lips and a capacity for breeding like rabbits. And I'd like to close with the thought that there's a whale of a lot we can do to speed up production in this challenging and chaotic area and to decrease its cost.

I think I'll go up to the Lee Hobby Foundry and take off a heat, just for the heck of it, even if I have to pig the iron.

FEF Booklet Describes Progress of Its Work

The Foundry Educational Foundation, Cleveland, has produced a new booklet entitled "Let's Look Ahead" which tells the story of its work in behalf of the continued growth and increased productivity of the foundry industry.

The illustrated booklet outlines the foundation's scholarship program and other services designed to help develop students into producers and customers for the foundry industry. It also outlines the progress of the foundation, through the help of its participating members, in expanding the student program.

Copies of the boklet are available from the FEF, 1138 Terminal Tower, Cleveland 13, O.

FOUNDRYGIANT Glass Fabric Belt

"Lasts six times longer than other belts,"

SAYS BIG CALIFORNIA FOUNDRY

This 18" U.S. FoundryGiant conveyor belt carries reclaimed sand under extreme outside heat conditions. So far, it has lasted *six times longer* than any previous belt on this job. Foundry executives expect there's a lot more life still in the belt.

A second U.S. FoundryGiant glass fabric belt carries extremely hot shakeout sand back to the reclaiming system. Both belts are delivering services far beyond what the foundry executives expected of conveyor belts.

The quality and durability built into all products made by "U.S." for the foundry industry lower maintenance and overhead costs. These "U.S." products—along with skilled engineering service—are obtainable at any of the 28 "U.S." District Sales Offices, at selected distributors or write U.S. Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N. Y.

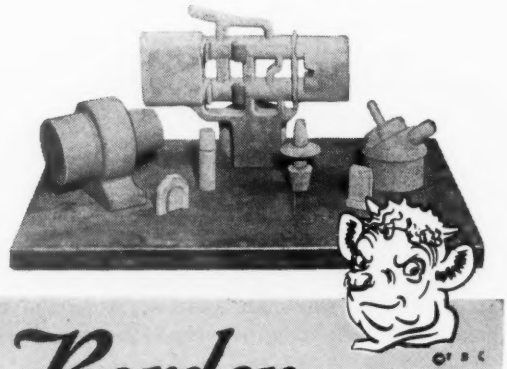
Mechanical Goods Division

United States Rubber

"that's what I call smooth, hard cores!"

"they all are, since we switched to *Borden* resins!"

Just combine efficient baking equipment with Borden resins and you, too, can get smooth, hard cores like those shown below . . . in intricate shapes . . . in large or small sizes. They're cores that mean better castings, less scrap. And they speed production because Borden resins assure faster bake-out, easier shake-out, contain no volatiles to gum up oven interiors. If you'd like a trial run—with a Borden technical expert to assist you—write The Borden Company, Chemical Division, Dept. F-116, 350 Madison Ave., New York 17, N. Y.



FOUNDRY RESINS THE *Borden* COMPANY
CHEMICAL DIVISION

UREA AND PHENOLIC RESIN CORE BINDERS . . . SHELL MOLD RESINS . . . CORE SPRAY . . . CORE PASTE . . . PARTING AGENTS

Obituary

WILLIAM B. COLEMAN, 68, president, W. B. Coleman & Co., Philadelphia, died Sept. 30 in Atlantic City, N. J. A graduate of University of Pennsylvania, he worked in the laboratories of Midvale Steel Co., Philadelphia, later being placed in charge of its foundries. In 1918 he became superintendent, Tacony Ordnance Corp., a government-built plant for manufacture of field artillery, at the same time serving as civilian consultant to the Ordnance Department, Washington. He was general

WILLIAM B. COLEMAN

superintendent of Penn Seaboard Steel Corp., after it took over Tacony, and in 1922 established his firm of chemical and metallurgical consultants. Mr. Coleman was chairman of the Philadelphia Chapter of the AFS in 1935-36, and he was currently serving as its secretary-treasurer. An annual lecture named in his honor was instituted by the chapter in 1954. Mr. Coleman was president of the American Society for Metals in 1933.

Robert B. Pogue, 67, consulting engineer and former vice president-engineering, Brake Shoe & Castings Division, American Brake Shoe Co., New York, died Sept. 26. A graduate of University of Kentucky, he held a master's degree from University of Illinois. He joined the company in 1916, became chief engineer in 1937, and vice president-engineering in 1949. Mr. Pogue retired in 1954.

Thomas F. Butler, 67, manufacturer's representative, died Sept. 29, in Detroit. A native of Hinton, Ky., he was graduated from University of Kentucky in 1914, and was associated with American Bridge Co., Pittsburgh, as construction engineer, for 7 years. In 1920, he joined Ford Motor Co., Detroit, and was plant engineer at the Rouge Plant, Dearborn, Mich., until 1954 when he became special engineering representative, Claude B. Schneible Co., Detroit. Since June, 1955, when he left the Schneible company, he had operated his own equipment sales agency in Hinton.

Herbert T. Herr Jr., 58, president, J. S. McCormick Co., Pittsburgh foundry supply firm, died Aug. 31, while vacationing in Ontario, Canada. A native of Denver, he was a graduate of Yale University.

Arthur M. Malone, 61, superintendent, Brost Pattern & Casting Co., Cleveland, died Sept. 16. He joined the company 3 years ago after 26 years as a foreman for the Aluminum Co. of America, Cleveland.

Joseph W. C. Bullard Sr., 74, retired vice president and a director, the Bullard Co., Bridgeport, Conn., died Sept. 16. After his retirement in 1947 he formed J. W. Bullard & Sons Inc., a separate machine company in Fairfield, Conn., serving as its vice president.

Charles E. Bunting, 70, board chairman and former president, Bunting Brass & Bronze Co., Toledo, O., died Sept. 30. The company was founded by Mr. Bunting, his father and his brothers in Alliance, O., in 1907, and moved to Toledo three years later.

Irving H. Tolles, retired vice president and director, Waterbury Foundry Co., Waterbury, Conn., died Sept. 23, in Plymouth, Conn. Mr. Tolles was graduated from Tufts College in 1910 with a degree in electrical engineering.

Clement J. Pierson, 55, a broker for foundry sand, operating the Pierson Bros. Sand Co., Milwaukee, died Sept. 27. He had operated the business since 1936, when he inherited it from his father.

Frank J. Caulfield, 58, president, Fords Foundry Co., Fords, N. J., founded by his father in 1921, died Sept. 19.

Charles Reymann Sr., 86, chairman of the Atlantic Foundry Co., Akron, died Oct. 11.

SILENT HOIST KRANE KAR

"HAS GIVEN US EXCELLENT SERVICE AT LOW MAINTENANCE COST," says ATLAS FORGINGS COMPANY CICERO, ILL.

"KRANE KAR Unloads freight cars of billets weighing up to 6000 lbs. . . . Stacks them in yard . . . Transports billets to saw shop . . . Loads forgings on trucks for shipment. KRANE KAR is easier to use than our old stationary crane, and saves us time. Now we can make full use of our yard for billet inventory." Ask for Bulletin #79.

Ask about our Lease-a-KRANE KAR-Plan . . . 1 to 3 Year Lease with Option to Purchase.

Another SILENT HOIST "First" —FLUID DRIVE!

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Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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Entering weight and dimensional data on control record at the press which forms refractory brick under high pressure. Representative control charts are shown above.

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AND SUBSIDIARIES

World's Most Complete Refractories Service

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assures predictable and uniform

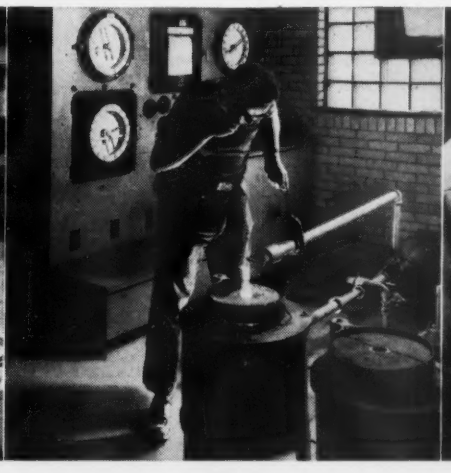
refractories performance

from Harbison-Walker products

Through Statistical Quality Control, Harbison-Walker maintains within closest commercial limits, the highest standards of all characteristics upon which depend the best and most uniform refractory service. Comprehensive control procedure extends from the raw materials through every manufacturing detail with the aid of instrumentation and precise laboratory testing. By this highly developed technique, uniformity of product is achieved which assures predictable and consistently uniform refractories performance. It is possible to estimate service life more accurately and plan furnace campaigns with confidence. With this established uniformity of quality, operating interruptions are fewer and maintenance costs are considerably reduced.

"Lump samples" of clay received from the mine are examined after test-firing.

Determining refractoriness by the "Pyrometric Cone Equivalent" method.



Screen analysis of Brick Mix is an important control operation.

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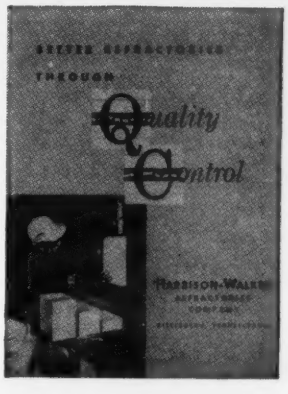
The program by which Harbison-Walker controls the properties and quality of the various refractories is described in detail in the new brochure *Better Refractories Through Quality Control.* It shows how uniformity is achieved and maintained in the refractories made from natural minerals from mines and quarries. A copy of this brochure will be gladly sent to you on request.



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Pittsburgh 22, Pennsylvania

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Circle 679 on Inquiry Card—Page 255

Foundry Developments

By EDWIN BREMER
Metallurgical Editor

NEW development in steel melting is a combination unit incorporating a graphite-rod resistance heating element above the bath in a low-frequency type electric furnace. Described in the July 19, 1956, issue of *Giesserei* (Dusseldorf, Germany), the unit employs a magnesite or dolomite lining. Results indicate that with a 2200-lb steel charge the carbon is reduced from 0.41 to 0.03 per cent in 100 minutes with addition of 44 lb of ore alone at a temperature of 2912° F.

In a heat containing 0.25 per cent phosphorus and 0.60 per cent carbon, the phosphorus was reduced to about 0.05 per cent by addition of 88 lb of a mixture of lime, sand and ore at a temperature of 2912° F. The black slag was removed after about 55 minutes and replaced with straight ore. Temperature was increased to 3000 to 3050° F, and the carbon reduced from around 0.26 per cent to 0.005 to 0.013 per cent in 45 minutes. Total time was 110 minutes. With cast iron the sulphur was decreased from 0.140 per cent to 0.024 per cent by use of a lime-fluorspar-carbon mix in about 95 minutes at a temperature of 2640 to 2730° F.

Casts Pipe Continuously

PRODUCTION of cast iron pipe in diameters from 15 to 39 in. and up to 33 ft long is being accomplished in Germany by a new method termed "continuous casting," according to a paper presented at the recent Foundry Congress held in Dusseldorf. In the process the molten metal is poured into a relatively short water-cooled chill, and as the tube solidifies it is drawn down slowly on a hydraulically operated table or platform. Tubes or pipes with and without flanges and spigots at one end, as well as solid cylinders up to 10 in. in diam, are made.

Sound Casting Aids

FURTHER investigation of mold reaction in production of castings in the aluminum-10 per cent magnesium alloy indicates that the effect may be minimized by attention to sand and inhibitors. Details are presented in "The Influence of Mold Variables and Inhibitors on Mold Reaction in Aluminum-10 Per Cent Magnesium Alloy" by Marjorie Whitaker in the June, 1956, issue of the *Journal* of the Institute of Metals (London). Use of medium or fine molding sands rammed as hard as consistent with adequate permeability and other characteristics is recommended. Ammonium bifluoride is more effective than additions of boric acid to the sand. For sections up to ¾-in. thick, use of 1 per cent bifluoride or boric acid (2 per cent for ½-in.) mixed with the sand or coated on the sand is suggested. For sections ¾ to 1 in., use 2 per cent bifluoride or boric acid. For sections 1 to 1½ in., use 6 per cent bifluoride in the sand. For those 1½ to 2 in., use of 6 per cent bifluoride in the sand with adequate chills is suggested.

Shows High Strength

GERMAN patent No. 940,324 describes a heat-treatable aluminum alloy containing 2 to 6 per cent Zn, 3.4 to 12 per cent Mg, 0.05 to 1 per cent Cr and up to 1 per cent Mn. The alloy is treated by homogenization and aging. An alloy containing 4 per cent Zn, 5.8 per cent Mg, 0.2 per cent Mn, 0.3 per cent Cr (0.12 per cent Si) (0.02 per cent Fe) showed after quenching from 842° F and aging for 20 days a tensile strength of 66,850 psi, a yield strength of 41,250 psi and an elongation of 14 per cent. Quenching from 842° and annealing at 122° F, the alloy showed a tensile strength of 71,110 psi, yield point of 54,100 psi and an elongation of 18 per cent. With same quench and annealing at 393° F the values are 79,650 psi tensile strength, 65,425 psi yield strength and 8 per cent elongation.

Magnesium Additions

METHODS of adding metallic magnesium as such in producing nodular iron as practiced to some extent in Germany and France are described in "Latest Developments in Spheroidal-graphite Iron" by Braidwood in the May 17, 1956 issue of *Foundry Trade Journal*. In both countries sealed devices are used during magnesium addition. In Germany, the ladle itself is sealed with a combination cover and plunger to which the magnesium is attached. Magnesium may be refractory coated or in a thin-walled tube. Sealing is by deadweight of the cover and plunger which is sufficient to resist expected upward thrust of the reaction between magnesium and the iron, but below the pressure to which the ladle is designed and subjected to testing.

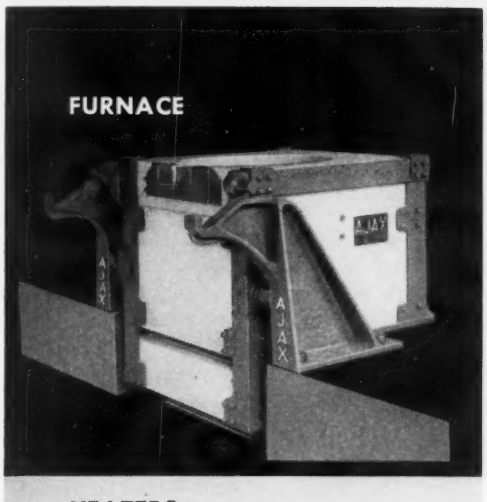
In France use is made of a separate pressure-resisting chamber into which the ladle containing the iron to be treated is placed. A cover containing a piston-operated plunger is sealed against the body of the chamber by upward thrust of a hydraulic ram. After sealing, the interior of the chamber is subjected to sufficient air pressure to raise it above the vapor pressure of magnesium at the temperature involved which prevents vaporization. Then the magnesium is added by means of the plunger, which is moved up and down to effect thorough mixing. It is said that due to high recovery, magnesium addition is low. Also, heat loss is small and oxide fume practically absent. Additionally, a small amount of iron can be overdosed with magnesium and then diluted with untreated low-sulphur iron to produce nodular iron for casting.

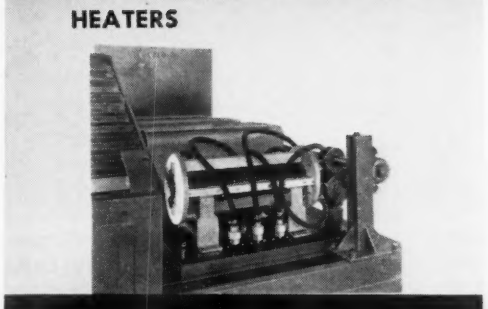
Gassing Cement-sand

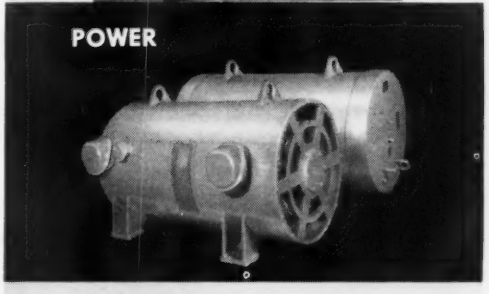
USERS of the cement-sand molding process should be interested in some work being done in Holland on application of gassing with CO_2 to provide rapid initial hardening or setting. The investigation discussed in the Aug. 15 and 31, 1956, issues of *Metalen* ('s Gravenhage, Netherlands) by Levelink, Bruschke and Roos indicates that gassing of cement-sand cores and molds with CO_2 for six minutes results in a compressive strength equal to that obtained by the usual air-hardening practice in 15 hours.

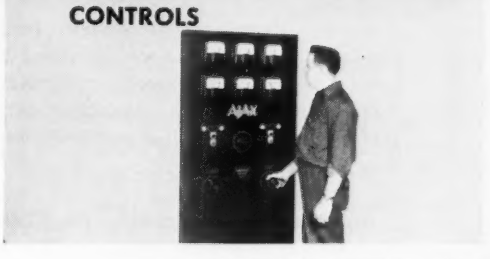
The method of gassing is similar to that employed when silicate binder is used—injection with small-diameter tubes. With 0.2-in. diam tubes an area 6 in. around the tube is hardened with a gas pressure of about 30 psi. Advantage of the method is that after gassing, the corebox can be removed and used for making another core. In some cases the core can be transported. Complete hardening is accomplished by air setting for some hours after the gassing operation with carbon dioxide.

AJAX...for complete induction heating-melting systems









Behind every induction furnace there must also be a source of power and a means of controlling that power. While the characteristics of any one of these three elements limits the selection of the other two, there are no hard and fast rules to follow when designing a complete system. Only experienced specialists can effect the perfect match which alone assures you all the advantages induction methods can provide.

You can get some idea of the breadth of choice which exists when planning a system from the general descriptions below. For further details, write Ajax Electrothermic Corporation, Trenton 5, New Jersey.

FURNACE

Tilting Type: Usually chosen for ferrous metals and larger charges of non-ferrous metals. Close coupling between coil and charge makes for high efficiency. Double trunnion keeps spout close to mold.

Lift-Coil Type: For non-ferrous metals in charges to 300 lbs. Inductor coil lowered over charged crucible; raised after charge melts; lowered over second crucible. Highly flexible.

Vacuum and Pressure Type: Wherever exceptionally high purity is required. Custom designed for charges from a few pounds to over 1000 lbs. (steel).

Special Types: AJAX has often drawn on its long experience to design and construct numerous furnaces and crucibles of special sizes and shapes and materials.

HEATERS

General Purpose: Inductors can be designed for any induction heating job. Inexpensive heaters can easily be interchanged for various load sizes and shapes. Special inductors are available to focus heat for forging, brazing, hardening, soldering, etc.

Carbides: These special furnaces for making and hot-working carbides are usually equipped with graphite crucibles or sleeves, able to withstand very high temperatures. Units are available for hot-pressing carbides in vertical or horizontal presses.

POWER

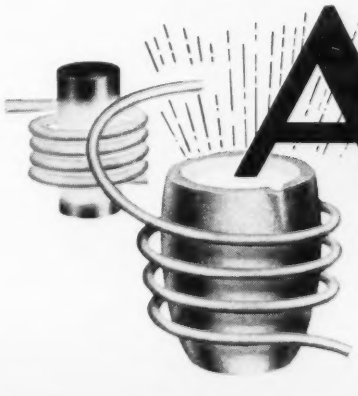
Motor Generators: Used for most large production heating and melting jobs. Available at frequencies from 1 to 10 kc, with output from 30 to 1250 kw and up.

High Frequency Converters: Spark gap converters used in laboratories and for small production jobs. Self-tuning. Frequency range from 12 to 60 kc, at power ratings of 6, 20, and 40 kw.

CONTROLS

All controls for an AJAX installation are grouped in one convenient location. Complete instrumentation permits even a relatively unskilled operator to keep the furnace at top efficiency. The panel shown controls a motor generator set. Converter controls are generally more simple, and are mounted on the converter cabinet.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

Industry Briefs

MARION Malleable Iron Works, Marion, Ind., will install completely automated heat treating equipment early in 1957. The new electric furnace will be built by the Industrial Heating Department of General Electric Co. and is the first step in an extensive modernization program expected to increase the firm's total production by 50 per cent. Total production of the Marion plant will be about 2400 tons a month, of both standard and pearlitic malleable, when the four-year expansion program is completed.

Grindle Division of the C. O. Bartlett & Snow Co., formerly located in Harvey, Ill., has been moved to the company's main headquarters, 6200 Harvard Ave., Cleveland 5. The division specializes in cupolas, cupola charging equipment, melting furnaces and dust, fume and smoke control equipment. John Donaldson is division manager and Judson H. Gougler is chief of engineering and design.

Ford Motor Co. has awarded Lindberg Industrial Corp., Chicago, the contract for 14 field-erected aluminum reverberatory-type furnaces, most of which will have a holding capacity of 65,000 lb each, at its new Sheffield, Ala., plant. Molten aluminum will be received in special mobile carriers from a nearby Reynolds Metals Co. primary metal plant. Ford will require about 64 million lb of aluminum annually for the production of permanent mold and die castings.

Oklahoma Steel Castings Co., Tulsa, Okla., is planning construction of an automated gray iron and steel foundry. Steel will be poured into molds on a car conveyor during one shift and iron will be poured on the same line during the second shift. Cores, hardened with CO_2, will be made right on the molding line.

Ohio Ferro-Alloys Corp., Canton, O., has built a new barge dock on the Ohio river, adjacent to its Brilliant, O., plant, at a cost of about $40,000. A 15,000-kva electric furnace was put into operation at the plant recently, and an extension is being made to the main furnace building.

Jeffrey Mfg. Co., Columbus, O., has opened a San Francisco warehouse at 1862 Rollins Rd., Burlingame, Calif. The building also houses the company's San Francisco sales headquarters, formerly situated at 870 Market St., San Francisco.

ALTER CO. SPREADS OUT: As the initial phase of a $3 million expansion program, Alter Co., Davenport, Iowa, has purchased all physical assets of Davenport Besler Corp., Davenport. Alter markets steel scrap and nickel alloys, and it will install additional electric furnace facilities for production of master nickel alloys that will increase its present capacity 400 per cent. It also has purchased what is said to be the largest scrap baling press ever manufactured. The Davenport Besler purchase involves 42 acres of property and 213,000 sq ft of buildings. Alter's scope of operations is worldwide

Shaw Process Development Corp., a subsidiary of British Industries Corp., has completed a pilot foundry and laboratory facilities at its Port Washington, N. Y., headquarters, 80 Shore Rd. It will use them to train personnel of Shaw Process licensee foundries in its method of producing investment castings.

Sterling Foundry Co., Wellington, O., has acquired in excess of 90 per cent of the outstanding shares of Brown Industries Inc., a Sandusky, O., foundry. Brown Industries will be operated as an independent unit under management of Sterling Foundry, which is a subsidiary of Warner & Swasey Co., Cleveland.

Pangborn Corp., Hagerstown, Md., has signed an exclusive licensing agreement with Hepburn Conveyor Co., Wakefield, England, for sole manufacturing and sales rights of Pangborn equipment in England, Scotland, Wales, Ireland, Australia, New Zealand and the Union of South Africa.

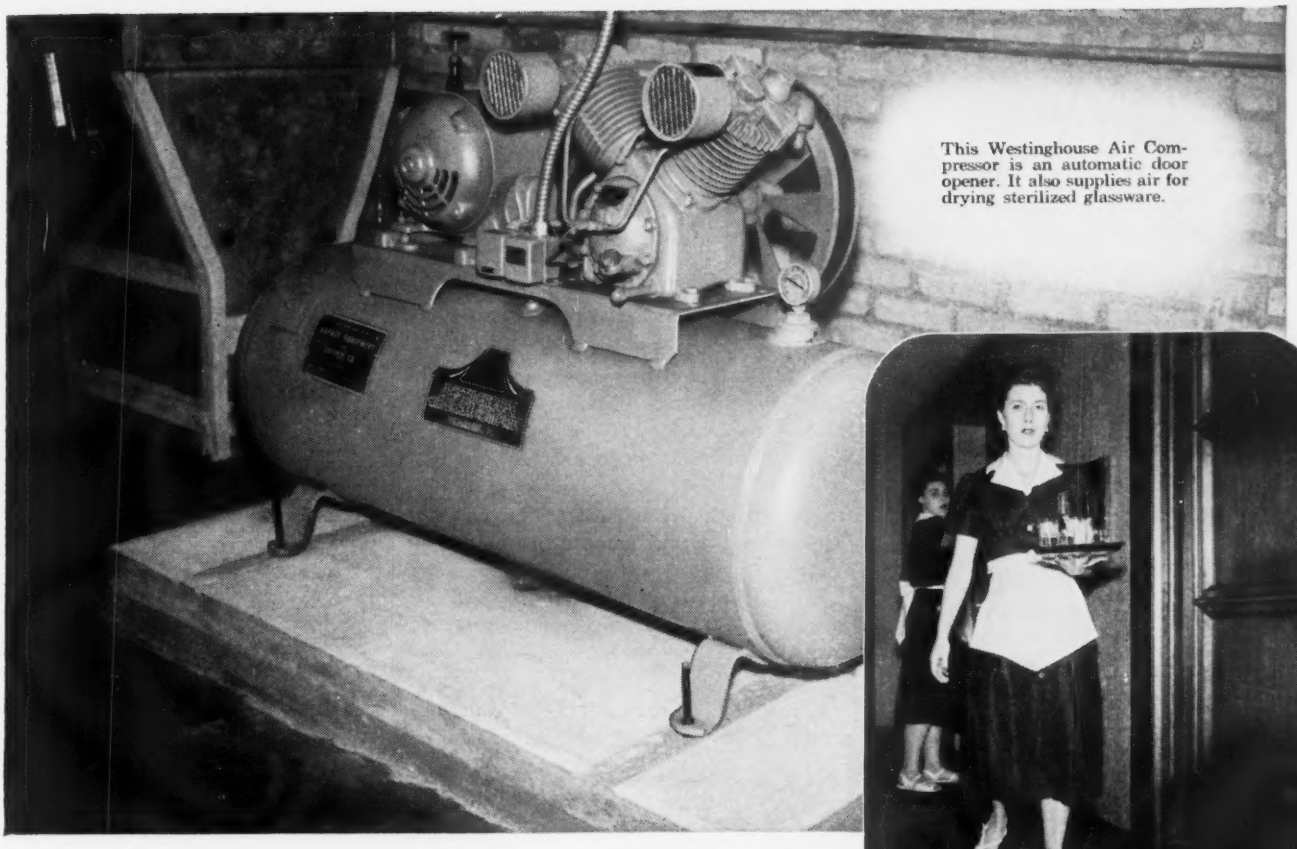
Lewis-Shepard Products Inc., Watertown, Mass., has appointed Merle Thayer to be its sales and service representative in the Omaha, Nebr., area. Mr. Thayer's sales and service facilities are at 1509 Chicago St., Omaha.

Knute Palmquist Foundry Inc., Oakland, Calif., has been awarded a safety award certificate by Argonaut Insurance Group, its insurance carrier, for an outstanding accident prevention record.

Smith & Richardson Mfg. Co., Geneva, Ill., has purchased the chaplet business of Shanafelt Mfg. Co., Canton, O. However, Shanafelt will continue to produce its line of steel flasks and flask pins and bushings.

Towmotor Corp., Cleveland, has opened a new service branch at 6920 Crescent Blvd., Camden, N. J. W. G. Wilhelm is manager.

Adell Foundry Co. has been formed in Adell, Wis., with an authorized capital stock of 500 shares of Class A common and 2500 shares of Class B common, both at par value of $100 per share. Incorpora-



This Westinghouse Air Compressor is an automatic door opener. It also supplies air for drying sterilized glassware.

Open Sesame

...the magic flexibility of air power supplied by Westinghouse Air Compressors, opens the door to greater efficiency, lower costs

The usefulness of compressed air is little short of amazing. It opens doors, inflates tires, paints equipment, runs punch presses, operates hoists and myriads of pneumatic tools that multiply a worker's productivity.

There are many more uses, but they all add up to lower costs. That's why the source of your air power is so important. It must be dependable to produce maximum savings — it should be a Westinghouse Compressor. Here are a few reasons why:

Low oil-level protection — your Westinghouse won't pump air if the oil-level or oil pressure is too low. You never get repair bills for lack of lubrication.

Automotive-type lubrication — constant pressure principle forces oil to every moving part for longer life.

Single- and two-stage, air-cooled design — provide air at maximum efficiency. Cost less to operate.

Starting unloader — keeps compressor unloaded until motor reaches normal speed and oil circulation starts.

Thermal overload protection — cuts current if motor should overheat or if line voltage should drop.

Open the door to lower costs with dependable air power. Insist on Westinghouse Air Compressors in your plant. Sizes up to 40 hp. Write for latest literature.

W-104

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 1, Wisconsin

PORTABLE AIR COMPRESSORS | TRACTAIR | STATIONARY AIR COMPRESSORS | AIR TOOLS | ENGINES

tion papers were signed by Richard A., Richard J. and Chester W. Goldberg. Richard A. Goldberg, Adell, is registered agent.

Gaines Co., Los Angeles, has moved its foundry to new and larger quarters at 7803 Industry Ave., Rivera, Calif. The new plant has 30,000 sq ft of floor space on 1½ acres of ground and will increase production capacity by more than 300 per cent. It includes a tool and die shop.

International Harvester Co., Chicago, will permanently discontinue operations at its Richmond, Ind., farm implement plant in the spring of 1957. The changing nature of the farm implement market and the characteristics of the plant are said to be responsible for the shutdown.

Ajax Flexible Coupling Co., Westfield, N. Y., has begun construction of an addition to its plant which will double production of many of its products. The plant is expected to be ready for occupancy by early November.

Swedish Crucible Steel Co. now is located at 8801 Conant, Detroit 11. The telephone number, TR 5-5831, is unchanged.

Chas. Taylor Sons Co., Cincinnati, a subsidiary of National Lead Co., has appointed Mexico Refractories Co., Havana, Cuba, to be its exclusive representative for the sale of Taylor special refractories in Cuba. The Cuban firm is a subsidiary of Mexico Refractories Co., Mexico, Mo.

Herman Pneumatic Machine Co., Pittsburgh, has enlarged the territory covered by Edwin A. Swensson Co., its Detroit representative, to include most of the province of Ontario, Canada, as well as the state of Michigan and Toledo, O.

New Plastic Corporation, Los Angeles, recently purchased Lansco Die Casting Co., El Monte, Calif., which it will operate as a wholly owned subsidiary. All key personnel of Lansco have been retained.

Harold J. Roast, foundry consultant, has changed his address to 71 Pine St. North, Port Hope, Ont., Canada.

C. R. Daniels Inc., Daniels, Md., has moved its Dallas Office at 2109 East Commerce St. to 9200 Chancellor Row, Brook Hollow, Ind. Dist. The telephone number is Dixon 9010.

Thor Power Tool Co. has moved its Detroit factory sales and service branch to a new and larger building at 14515 Puritan Ave. The company plans to open a new branch in Indianapolis later this year.

Holcroft & Co., Detroit, announces that its Chicago representative, A. A. Engelhardt, has moved to 4935 West Fullerton Ave., Chicago 39. Telephone number is Tuxedo 9-6220. Holcroft produces heat treating furnaces.

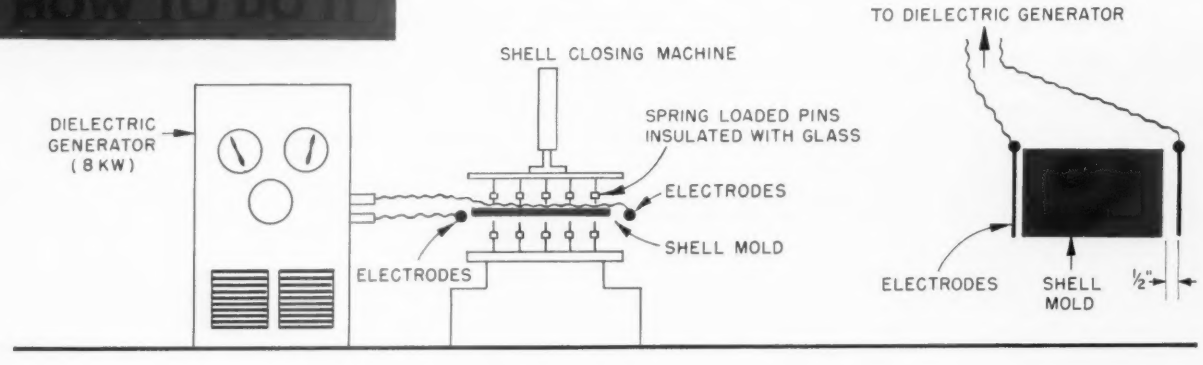
Interstate Air Conditioning Co., 719 West Seventh St., Sioux City, Iowa, has been appointed distributor of Dravo Corp. heating equipment for a territory which includes 47 South Dakota counties and 10 in Iowa.

Harris Metals Treating Co., Racine, Wis., has added shell molding facilities to its operations, at a cost of $80,000. The firm has been active in the metal treating field for 12 years.

Link-Belt Co., Chicago, has moved its Cleveland offices to larger quarters in a new building at 3592 Lee Rd., Cleveland 20, O.

American Baler Co., Bellevue, O., has added facilities for the development of a line of components for industrial ovens.

HOW TO DO IT



Shell Mold Halves Are Pasted Cold With Resin and Corn Flour Mixture

By MARRACCINI VINICIO
Villaggio Piaggio 10
Pentedera, Italy

COLD shell mold halves can be pasted with a half-and-half mixture of melaminic resin and corn flour diluted in water, plus the application of dielectric heat.

The procedure is to put the drag on the pins of a pressure closing machine, brush on a film of the bonding mixture and set any required cores. Place the cope on top and close the machine. Heat is produced by two electrodes mounted on the closing machine at opposite ends of the mold in the same plane as the parting line. An 8 kw generator energizes the electrodes, causing the melaminic resin to polymerize immediately and bond the mold halves together.

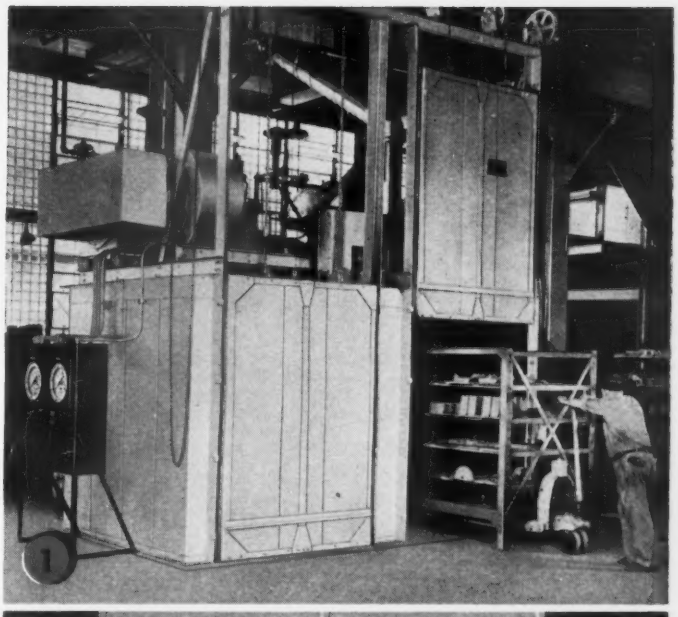
The same bonding process has been applied successfully to dried oil sand molds.

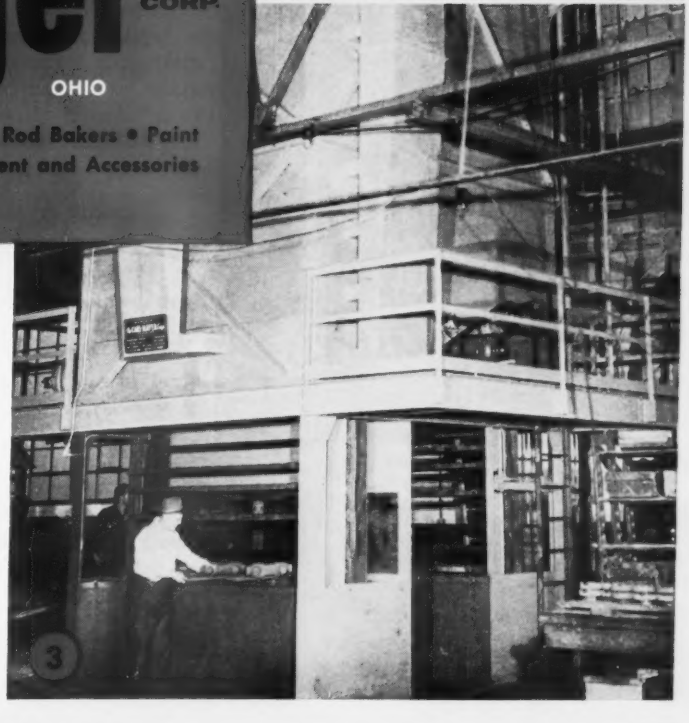
Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

carl mayer CAN DO IT

That's right, for any baking requirement there's a Carl Mayer oven that will do the job faster and cheaper, to give you the efficiency so necessary in today's competitive markets.

The exclusive heat recirculation and slotted panel construction features cut fuel costs and heating times by as much as 50%. Uniform temperatures, assured by heat recirculation, guarantee perfect baking conditions throughout the entire oven.





THE **carl mayer** CORP.

3030 EUCLID AVENUE CLEVELAND 15, OHIO

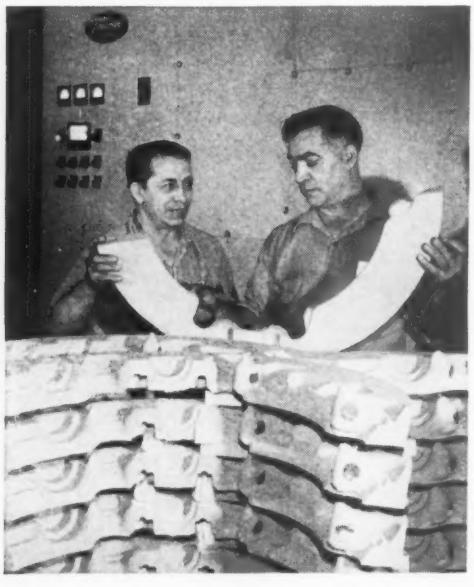
OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories

Write for Bulletin 53-CM

Hundreds of modern foundries of all sizes have found the efficiency and economy of Carl Mayer ovens pay off. Find out for yourself. Our engineers will be happy to consult with you on your particular problem.

1. This rack type oven, with heat recirculation, holds temperatures within ±5° throughout the oven.
2. Downdraft heating method on this car type oven increases efficiency up to 50%.
3. This vertical oven features the special internal heat fan—increases efficiency, lowers maintenance cost.

"Core baking is faster and more flexible" *says Bendix Foundries*



"Our former core baking required a two-hour cycle. Now we are on a 15-minute cycle with two 30 KW THERMEX* Core-Baking Units. Special, rush orders can be put through fast. Cores are dried more uniformly. Dimensions are more accurate. Core loss due to breakage is practically nil. There's no smoke or oven heat. Output per square foot of floor space is far greater. Continuous flow has reduced our need for core storage space."

These are the results reported at Bendix Foundries, Bendix Aviation Corporation, Teeterboro, New Jersey. Find out today how you can improve *your* core baking with THERMEX Dielectric Core-Baking Equipment. Call or write The Girdler Company, Thermex Division, Louisville 1, Ky.

*THERMEX—Trade-Mark Reg. U. S. Pat. Off.

◀ *Bendix cores are now stronger. No reinforcing is required.*

The GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
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FOR HEAVY DUTY FOUNDRY SERVICE AT A SURPRISINGLY LOW PRICE...

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ENTIRELY NEW
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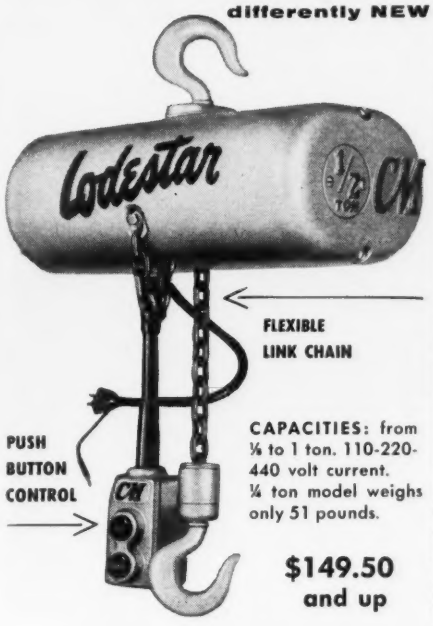

CAPACITIES: from ⅛ to 1 ton. 110-220-440 volt current. ¼ ton model weighs only 51 pounds.

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...THE FIRST TRULY "HEAVY DUTY" VERSION OF THE SMALL ELECTRIC HOIST

Featuring:

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- Overload Protection
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Circle 684 on Inquiry Card—Page 255

Meditations of a Sandman

By HAROLD E. HENDERSON
H. C. Macaulay Foundry Co.
Berkeley, Calif.

"Extra Rehearsal"

AS A SORT of extracurricular activity, I have been intensely interested for many years in the theater and its people. I presume that most of us are in some degree goaded by the "ham urge," or, as it is known technically, "exhibitionism." In this respect, our good friend Harry Kessler, a metallurgist of considerable fame, must thoroughly enjoy his public appearances as referee in the nationally televised Madison Square Garden boxing matches. It has become his hobby and gives expression to another facet of the man.

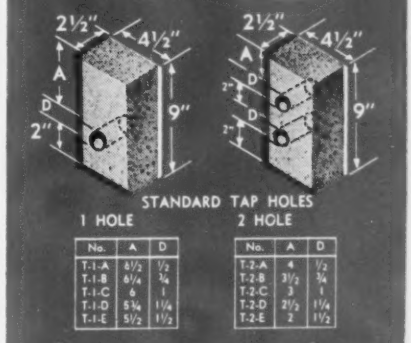
The entertainment world has been enriched in many instances by the foundry's contribution of acceptable talent. Most of us, however (no matter how gifted in our own estimation), have managed to resist the urge of grease paint and footlights and have contented ourselves with a less glamorous way of obtaining a livelihood. Yet, once you've experienced backstage excitement, with its emotionally charged atmosphere on an opening night, nothing else ever will seem quite as important.

I mention this merely to indicate that I have many friends in the land of make-believe from whom I have learned lessons not found elsewhere. I believe one of these lessons is applicable to foundry practice—the need for repeated rehearsals in fundamentals.

A theatrical production worthy of Broadway presentation costs a lot of money. Aside from the story, scenery, costumes, publicity and many other important details, there is the matter of select casting and the many tedious weeks of meticulous rehearsals.

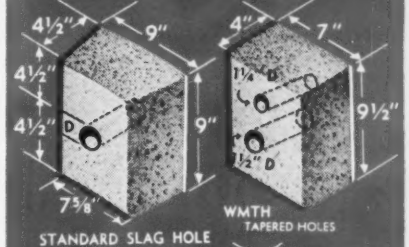
Once a show has been a pronounced success on Broadway for a year or more, it often is considered financially advisable to send a touring company throughout the hinterland to gather in the scattered dollars which New York publicity is certain to at-

STEP UP PRODUCTION with IRONTON TIME-SAVING SPECIALTIES for CUPOLAS



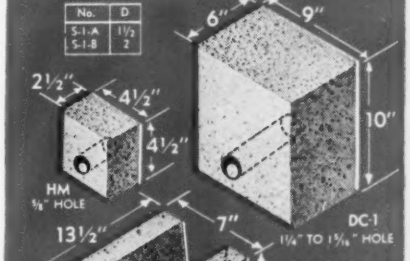
No.	A	D
T-1-A	6½	½
T-1-B	6¼	¾
T-1-C	6	1
T-1-D	5¾	1¼
T-1-E	5½	1½

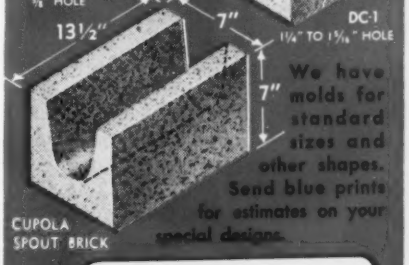
No.	A	D
T-2-A	4	½
T-2-B	3½	¾
T-2-C	3	1
T-2-D	2½	1¼
T-2-E	2	1½



STANDARD SLAG HOLE

No.	D
S-1-A	1½
S-1-B	2





We have molds for standard sizes and other shapes. Send blue prints for estimates on your special designs.

THE IRONTON FIRE BRICK COMPANY
SINCE 1917
IRONTON, OHIO
1335 Ashtabula Street
Reliable Refractories

Write for name of our nearest representative, or telephone Ironton 109

Circle 685 on Inquiry Card—Page 255

No Other Foundry Flask Gives You All 4 Features!

1. Continuous welding of bearing strips—inside and out.
2. Cast steel trunions.
3. Cast steel pinlugs and clamplugs.
4. Elimination of corner stresses.

Elliott Company Replaces With "PERFECTION" Foundry Flasks!

"PERFECTION" Flasks—

Designed By Foundrymen For Foundrymen!

Because of the rugged endurability of BS&B "PERFECTION" Foundry Flasks in the toughest kind of day-in and day-out foundry service, Elliott Company of Jeannette, Pa., has standardized on "PERFECTION" Flasks for all replacement purposes.

Elliott produces electric motors in one of the industry's most completely equipped and up-to-date grey iron foundries.

Here, BS&B "PERFECTION" Flasks in all sizes are giving long, economical and trouble-free service under the tremendous vibrations, jars, stresses and strains encountered daily on gravity rolls, roll-outs, conveyor lines and automatic shakeouts.

If you'd like more information on how "PERFECTION" Foundry Flasks can help you get better castings at lower cost, we'll gladly send it without obligation. Address your inquiry to . . .

EFFICIENCY · OVER 60 YEARS · BS&B · RELIABILITY · ANOTHER EXAMPLE OF PRODUCT LEADERSHIP

BLACK, SIVALLS & BRYSON, INC.

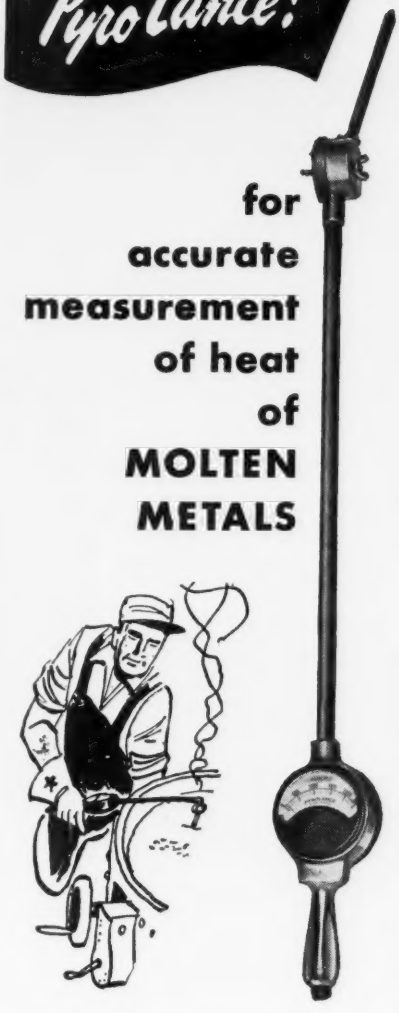
Foundry Flask Division—Dept. 7-AR11

7500 East 12th Street Kansas City 26, Missouri

Circle 686 on Inquiry Card—Page 255

Pyro Lance!

for accurate measurement of heat of MOLTEN METALS



For quick, accurate temperature readings of molten metals, operators of non-ferrous foundries everywhere are relying on the Alnor Pyro Lance. Portable, handy to use, the Pyro Lance has a protected thermocouple, with adjustable angle head, mounted in the lance tip. It takes temperature below the surface —unaffected by dross or other conditions. Here's an easily handled instrument to help control quality in the foundry. For complete information and prices on this valuable instrument write for Bulletin No. 1724-D. Illinois Testing Laboratories, Inc., Room 511, 420 N. LaSalle St., Chicago 10, Illinois.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Circle 687 on Inquiry Card—Page 255

tract. Such a company plays town after town, night after night, week after week, sometimes for many months.

Most actors become weary of repeating the same lines and doing the same things, over and over; and they begin to ad lib a few words of their own here and there and to change "slightly" some of their stage business. Often, in the course of three or four months, so many changes are made that the author hardly would recognize his own play.

The audience response is likely to suffer noticeably as a consequence of these ill-advised interpolations. At this point, the director should call the whole company together each morning for a re-renearsal of the entire play—getting back to the original script and seeing that all extraneous material is purged. Audience reaction should be improved instantly and the original quality of the play restored.

We experience something quite similar to this phase of show business in foundry sand practice. Observing strict control of a standard procedure is not nearly so simple as might be expected. Assuming that you know exactly what you want and have devised a sandmix that is reasonably satisfactory in day-to-day performance, you must impart this information to your man at the muller in such a way as to make error on his part practically impossible.

Suppose that the mix and the procedure have been explained clearly to him and that he has been warned of all possible pitfalls. He now must be rehearsed in the technique to be acquired. As in the case of the actor, one rehearsal is not sufficient. The mullerman also must memorize his lines and learn "to suit the action to the word." He must be corrected patiently when the inevitable "slips" occur.

You now are convinced that you have achieved "finish" in your performer and his performance, and you breathe a restful sigh of relief. The show goes on amid a burst of applause, and your efforts have paid off. Perhaps you have several troublefree weeks—then sand failure begins to show up. Casting defects begin to increase for no apparent reason. Everyone concerned swears that no change whatever has been made. The original plan is still in operation. (Note: L. P. Robinson says that he is going to entitle his autobiography *We Didn't Change a Thing!*)

But even the most elementary logic insists that something has been changed. It may require consider-

NOJOINT lasts 26 months where other linings for LADLES average only 1 month's service

A SERVICE REPORT from A. W. Varnon at Goslin-Birmingham Mfg. Co. proves the outstanding economy of *IRONTON* NOJOINT, the plastic refractory for all-around foundry use. In ladle No. 3, 12,000 lb. capacity, the NOJOINT lining lasted 26 months while handling 5200 tons of gray iron. In all that time, there was no patching or maintenance on the sides or bottom of the ladle.

***IRONTON* NOJOINT gives longer ladle life at rock-bottom cost for linings**

Mr. Varnon put $30.00 worth of NOJOINT in the ladle, so his cost per ton of metal handled is $.0056. If that is the kind of economy you want, switch to *IRONTON* NOJOINT now.

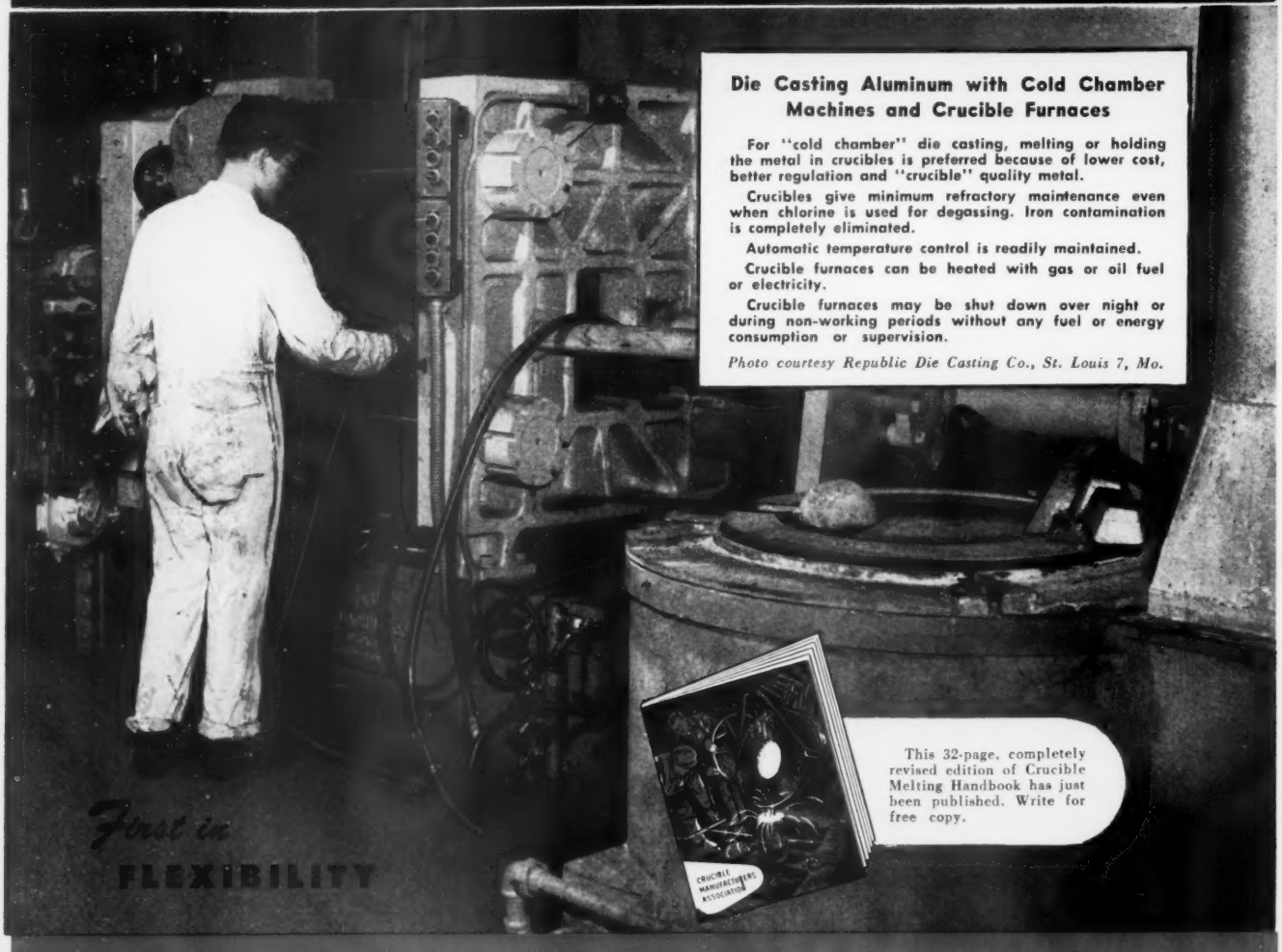
Ironton will send a "MAN WHO KNOWS" to help your foundry men put in a NOJOINT lining. Call or write today.

THE IRONTON FIRE BRICK COMPANY
SINCE 1917
IRONTON, OHIO
1333 Ashtabula Street
Reliable Refractories

Write for name of nearest Ironton man, or telephone Ironton 109

Circle 689 on Inquiry Card—Page 255

CRUCIBLE melting



Die Casting Aluminum with Cold Chamber Machines and Crucible Furnaces

For "cold chamber" die casting, melting or holding the metal in crucibles is preferred because of lower cost, better regulation and "crucible" quality metal.

Crucibles give minimum refractory maintenance even when chlorine is used for degassing. Iron contamination is completely eliminated.

Automatic temperature control is readily maintained.

Crucible furnaces can be heated with gas or oil fuel or electricity.

Crucible furnaces may be shut down over night or during non-working periods without any fuel or energy consumption or supervision.

Photo courtesy Republic Die Casting Co., St. Louis 7, Mo.

This 32-page, completely revised edition of Crucible Melting Handbook has just been published. Write for free copy.

First in FLEXIBILITY

CRUCIBLE MANUFACTURERS ASSOCIATION

11 W. 42nd STREET, NEW YORK 36, NEW YORK

CRUCIBLES FOR FLEXIBILITY

THESE FIRMS CAN TAKE CARE OF ALL YOUR REQUIREMENTS FOR CRUCIBLE MELTING

VESUVIUS CRUCIBLE CO.
AMERICAN REFRACTORIES & CRUCIBLE CORP.
ELECTRO REFRACTORIES & ABRASIVES CORP
JOSEPH DIXON CRUCIBLE CO.
ROSS-TACONY CRUCIBLE CO.
LAVA CRUCIBLE-REFRACTORIES CO.

able questioning to reveal the fact that a shipment of new and different sand has found its way into the system or that the purchasing agent is "saving money" on a different brand of bentonite, wood flour, core oil or something else or that gates or pattern have been changed. The list of possibilities is endless!

The first and most likely source of trouble is that moisture is out of control. (Surely no one would think of that.) At all events, there is no use blaming anyone. Find the trouble, if humanly possible (and it generally is); then correct it, and —tighten controls!

A F'rinstance. If honest confession is good for the soul, my heavenly chances should be considerably improved by relating the following. (Don't stop me if you've heard it before.)

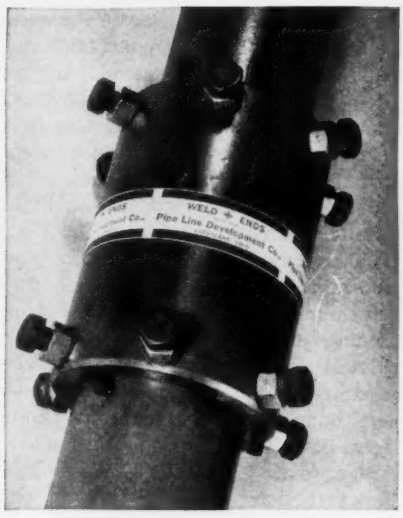
We were having "buckle trouble"—but plenty! We had tried every cure in the book, and we had broadcast a description of the disease, thus hoping to learn of a magic remedy.

Among other things, we were told that wood flour would do the trick. We bought and used a few sacks of the stuff, but our buckles did not diminish in the least. We also resorted to several proprietary materials purportedly designed to effect a cure. Nothing happened. We finally decided that softer ramming was the only palliative, but it proved to be no more than that. Our buckle had all the ominous aspect of a cancer.

Then "Fate" stepped in, as it usually does for me. A producer of wood flour suddenly realized that he had 20 tons of his cherished product unprotected from rains that were decidedly imminent—and with no buyers in sight. He offered me the entire lot at one-third the market price—delivered. Fortunately I had dry storage space and jumped at the bargain, purely as an investment. I intended to sell every pound of it to the trade at, shall we say 100 per cent profit? Yes, let's say that! What Scotsman wouldn't?

Well, to make a long and sordid story reasonably short, let us say that while I was waiting for wood-flour-hungry customers, I decided to try a little experiment. I instructed my muller man to add a gallon of this powdered wood to every 1000-lb batch of mulled sand. I intended that he should do this for about ten days and then, if no benefits were visible, discontinue the practice. However, I forgot to tell him about the ten-day suspension.

Two weeks passed in their accustomed order, with scabs and buckles still sickeningly evident. Then



NOW users of SAND TRANSMISSION PIPELINES Cut Replacement Time with Non-Welded Installations of WELD+ENDS with Clamping Screws

•

Replacing sand transmission piping lines is quicker, easier with non-welded installations of WELD + ENDS with clamping screws. No threading, no special make-ready is necessary. Cut the pipe—slip the WELD+ENDS on—tighten the clamping screws . . . That's all there is to it.

Non-welded WELD + ENDS are better than flanges, especially where there is frequent replacing of pipe. They can be used over and over again with only the clamping screws requiring replacement.

Where pipeline vibration is severe, clamping screws may be equipped with Nylok lock nuts and Shakeproof washers as shown in the illustration.

Reusable non-welded installations of WELD + ENDS offer continuous savings in down time and repair costs. Write today for further information—also inquire about Plidcowear erosion-resistant pipe. Address Dept. E24

THE PIPE LINE DEVELOPMENT CO.
5700 DETROIT AVE. • CLEVELAND 2, OHIO

Circle 691 on Inquiry Card—Page 255

Not a speck of slag or metal sticks to linings of IRONTON BERLITE

FILLED 974 TIMES, a 1200-pound ladle handled 670 tons of metal before the lining of *IRONTON* BERLITE was replaced. The iron was poured at 2850° F. in a foundry making automotive housings.

Clean Ladles are a profit factor . . . protecting quality of castings, reducing scrap, saving labor. It pays to use *IRONTON* BERLITE in hand, bull and mixing ladles . . . because BERLITE does not shrink or expand, resists slag and metal erosion, has a higher P.C.E. than any fire clay material. Ask an Ironton "MAN WHO KNOWS" how you can put BERLITE to work throughout your foundry.

THE IRONTON FIRE BRICK COMPANY
SINCE 1917 IRONTON, OHIO
1331 Ashtabula Street
Reliable Refractories

Write for name of nearest Ironton man, or telephone Ironton 109

Circle 692 on Inquiry Card—Page 255

Stearns Grinder Holding Magnet holds this casting firmly in upright position during grinding... reduces grinding time and hand finishing ...saves wear on grinding wheels by eliminating movement of casting.

Grinding time reduced 20 percent with Stearns grinder holding magnets

Production records of a midwest foundry show that by using Stearns Grinder Holding Magnets operators reduced grinding time by 20 percent on average castings, 15 percent in grinding risers from flat-surface castings and an additional 15 percent in positioning odd-shaped castings. Other users have reduced grinding costs by as much as 30 percent after installing Stearns magnets.

Holding all shapes of castings firmly in place, these powerful magnets permit operators to apply equal pressure at all times. No need for blocks, clamps, wedges or dangerous makeshift holders. Tilting models let you operate at angles up to 30 degrees in each direction. They lock securely at any point.

Ruggedly built for tough foundry duty, inexpensive to operate and maintain, Stearns Grinder Holding Magnets can help you cut grinding costs. Three sizes — 16 x 14 in., 16 x 24 in., 16 x 40 in. Small magnet excellent for single pieces, larger sizes for multiple units. Available with either hand or foot switch.

Modernize your grinding operations. Get the full story from your Stearns representative or write us for Bulletin 138-C. 1129

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY • VALPARAISO, INDIANA

662 South 28th Street • Milwaukee 46, Wisconsin

one day the foreman came to me with the startling announcement that our scabs and buckles "seemed to be getting smaller!" I humored him. Another week passed, and he wanted to know, "what are you doing to your sand? We haven't had a buckle for two days! Nothing but a few little rattails!" I calmly assured him that no changes had been made in the sand-mix and that the casting improvement must be due to better molding practice.

Seven days later, he fairly screamed at me, "Damn it, you must have done something to that sand! We've had five days without a buckle, scab or even a rattail! Things like this just don't happen! Come on, what have you done?" I led him gently over to my muller man. I said, "Tolbert, tell this bewildered foreman what changes you've made in your sand mix during the past three months." "Boss," he said, "we ain't made no changes in that mix for over six months!"

I turned to the foreman with a victorious smile. "Now are you satisfied? We've made no changes!"

As we started to walk away, Tolbert called to me from the muller. "Oh Boss, I just remembered—there was one change. You know that gallon of wood flour in every batch? Well, I still put it in. You didn't tell me when to stop."

That was it! A gradual buildup and maturing of wood flour, with casting finish improved in direct proportion to the buildup! I now consider wood flour my most important ingredient, except for water.

The question has been asked, "Isn't there a danger of getting too much cellulose material in your system? And if so, what do you do about it?"

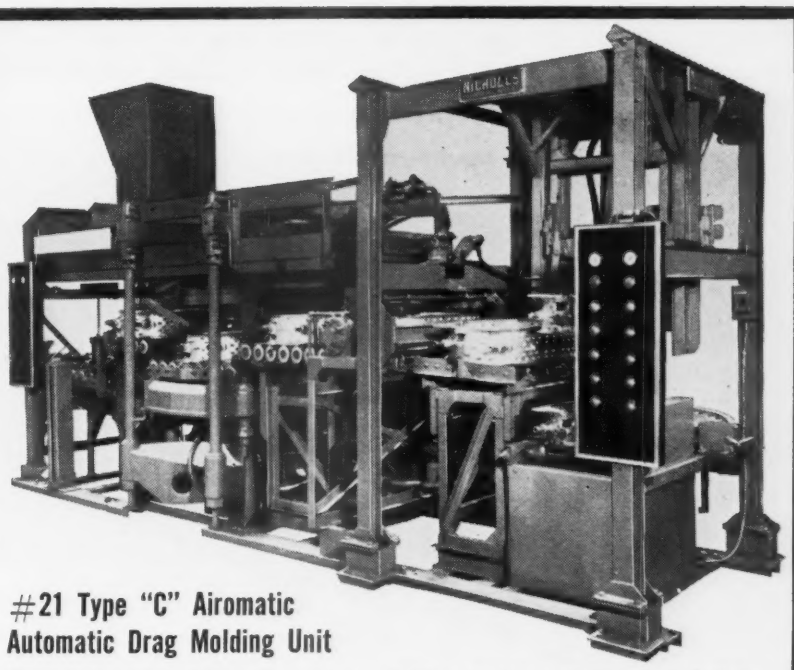
Yes, I'm quite sure that such a danger does exist; therefore I take volatile tests twice a month. If my loss by ignition exceeds 12 per cent, I reduce or temporarily discontinue my wood flour additions. When it drops to 7 per cent, I resume former practice.

Oh yes, we still produce unsaleable castings, and we have sand trouble that deepens our wrinkles, some of which seems quite beyond our *assumed* understanding. But "Old Man Buckle" is no longer our permanent house guest.

Heat Treating Billings Soar

Metal Treating Institute, New Rochelle, N. Y., reports that 1956 billings of member firms through August totaled $24,675,200, or a 27.3 per cent increase over the like period in 1955.

- **INCREASE** production . . .
- **SAVE** manhours . . .
- **GET** quality molds with the new



#21 Type "C" Airomatic Automatic Drag Molding Unit

Heavy Duty Jolt & Power Squeezer Drag Molding Machine with Pneumatic Pattern Draw. Equipped with air operated car type squeeze head and built-in flask roll-in and mold roll-out device with measuring sand hopper, flask indexing device and sand spill upset, flask feed-in elevator, mold turn-over and mold transfer.

NICHOLLS AIROMATIC

Nicholls has harnessed this molding machine's own driving force **airomatically** to give you a **better** job at **less** cost. There are no limit switches, no electrical timers, no electric pressure switches, no electrical latch relays, just **dependable,** reliable "push-button" air-to-air control throughout.

Yes, the new NICHOLLS AIROMATIC molding equipment makes, closes, removes and returns **consistent high-quality** molds **continuously . . . automatically.** It represents the acme of simplicity for the automatic production of high quality and high quantity mass produced sand molds.

Check **your** equipment **today.** Whatever your system, there's a Nicholls machine to fit the job. For information call or write

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Richmond Hill 18, Long Island, N. Y.

Compare this... with your **present equipment**

Can You

1. Push your "Stop" button and then after a pause, push your "Start" button and have your equipment continue with the next phase?
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3. Use a particular "Manual" button to pinch-hit in an emergency for a failed automatic phase in finishing out a molding shift?
4. Get 240 molds per hour (one every 15 seconds) hour after hour, shift after shift, day after day?

You CAN with a NICHOLLS AIROMATIC!

NICHOLLS

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Around the Country

NEWS REPORTS FROM

Buffalo . . . Philadelphia . . . Chicago . . . New York . . . Detroit . . . Cleveland

New York—October will be one of the better months of the year to date for district gray iron shops. It may prove to be at least the best since last May. Shops generally are operating five days a week, with those engaged in heavy work reporting backlogs of eight to 10 weeks (no change over the past month) and those doing light work, about three weeks.

Business in machine tool castings is well sustained, with some foundries operating five and a half days a week. Foundries turning out castings for road work, such as manhole covers, gratings, armored curbing, etc., are very busy. Also, there is considerable electrical equipment work. Shortage of molders continues.

The relatively light malleable and steel casting capacity in this area continues fully engaged. Backlogs on these castings run two months and beyond. Most nonferrous shops are busy, although principally on current orders. Few of the nonferrous shops —particularly the red metal shops— have much to show in the way of backlogs.

Slower housing starts are resulting in a decline in water meter requirements. Construction of large commercial buildings, apartments and industrial units is holding up, however, which means a fairly sustained volume of larger meter work. Demand is strong for industrial pumps, bearings and valves. Some captive shops engaged in this work are having to sublet business to the independents. Shipyard needs are improving.

Where business at the aluminum shops is not buoyed up by aircraft work, operations are largely on a current basis. Most plants are able to operate five days a week but are having to scratch for what they get, with backlogs light.

Chicago—Chicago high schools showed up well in the patternmaking and molding division of Ford Motor Co.'s 1956 Industrial Arts Awards. In the tenth annual competition, third place and six honorable mentions went to Chicago area students.

Winner of the third place and $60 was Don Upton, 16, a senior at Austin High School, for his entry of an aluminum casting of a pheasant. His instructor was John F. Dix.

Among the winners of honorable mention and $20 was another Austin High School student, Tony Bellio, 16, for a car club emblem. Five Chicago vocational high school students also won honorable mention as follows: Robert Olsen, 14, for coat hangers; Cliff Robinson, 14, bottle openers; John Schipitsch, 18, for a bootjack; Donald Szpenjnowski, 16, for a mail box; and Charles Yoways, 14, for a horseshoe plaque.

Entries in several divisions of the competition incorporated important use of patterns and castings, although the awards were in other categories. In the Model Division, for example, Neal Perschke, 16, of Beaver Dam, Wis., won first place with a model gas engine with pattern castings. This little four-cycle, one-cylinder overhead valve engine of 1.53 cu in. required patterns for 15 castings, four of which required cores. And as another example, in the Machine Shop Division, Daniel Kroth, 16, of Erie, Pa., won honorable mention and an ingenuity award for a folding golf cart which required the making of several aluminum castings.

Altogether more than 700 youngsters were selected through the competition as the nation's best young craftsmen. They shared $50,000 in awards offered by Ford for the largest program of its kind in the world. The winners represented 39 states, District of Columbia, Canada and Puerto Rico. The entries in the finals totaled more than 5000, after 40,000 projects had been entered in 41 regional competitions.

Aluminum casting of pheasant won third place in patternmaking and molding division of Ford Motor Co.'s 1956 Industrial Arts Award for Don Upton, Chicago, shown here

Requirements of the Ford-sponsored competition stipulate that entries must be made in school classes under instructor supervision. The range of the program's 14 divisions enables nearly any school-made project to be eligible.

Don Healas of Ford's Educational Affairs department reveals some interesting statistics which testify to the caliber of the participants in the competition. The national average of high school graduates entering college is 21 per cent. Of winners in the Ford Industrial Arts program, 46 per cent go to college, and 85 per cent follow in the fields in which they won their awards.

Buffalo— A 20,000 - square - foot addition to Chevrolet's foundry at Tonawanda, N. Y., will provide further high-efficiency equipment for this modern gray iron operation.

New facilities going into the addition, scheduled for over-all completion by mid-1957, include three vertical core ovens, three snag-grinders and 24 combination coreblowing and rollover draw machines.

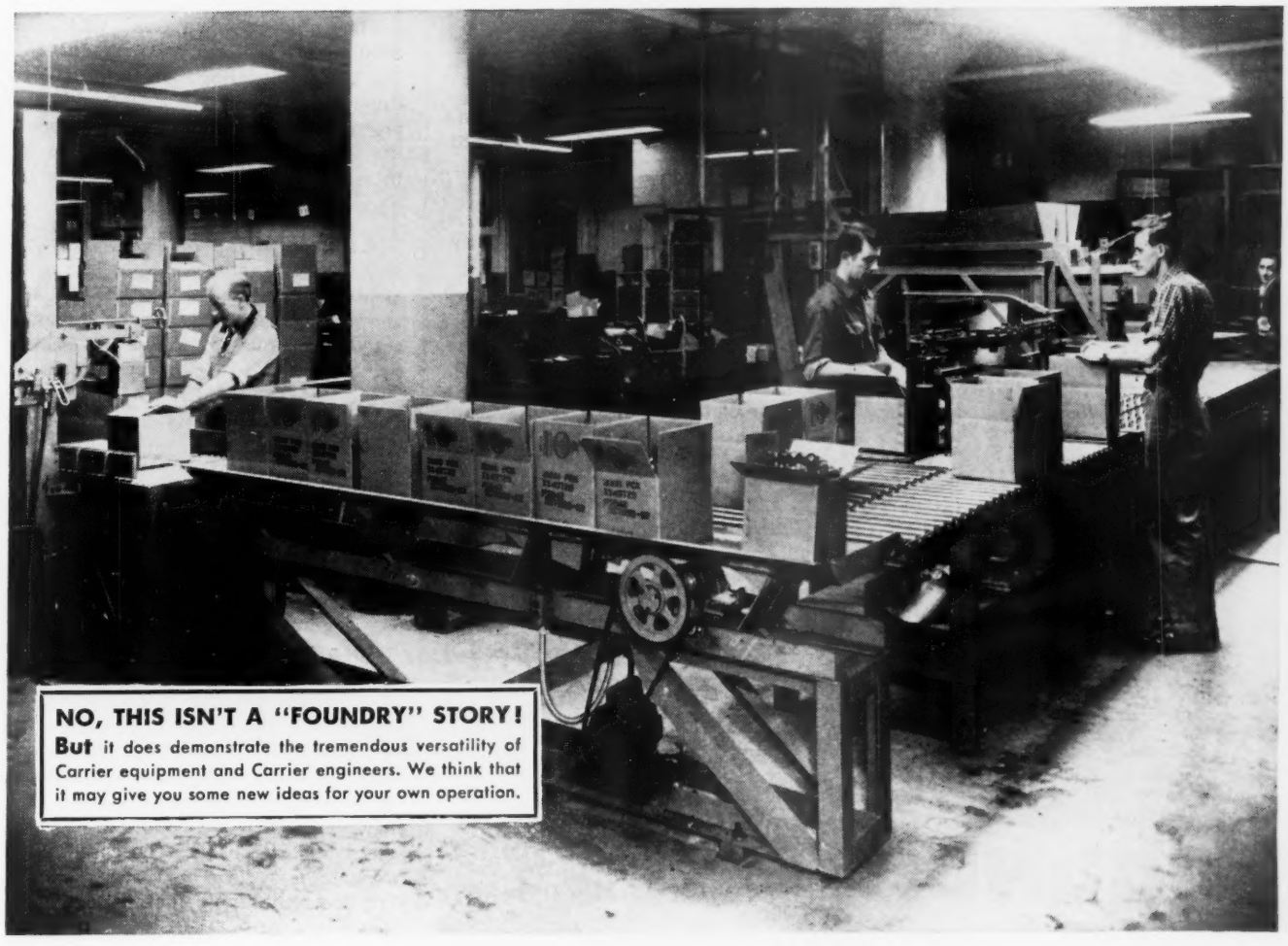
The coreblowers, to be supplied by International Molding Machine Co., La Grange Park, Ill., and the rollover units, from Sutter Products Co., Dearborn, Mich., will bring the total of such combination machines in the foundry to 64. They achieve high efficiency in producing cores for engine blocks.

The new core ovens, to be provided by Foundry Equipment Co., Cleveland, will boost the total of these units to nine. Foundry Equipment will also supply a core assembly paste-drying oven going into the new addition.

The snag-grinders will take the fins off castings for engine blocks, cylinder heads and intake manifolds. The two contracted for to date will be furnished by R. McDougall Co. Ltd., Galt, Ont.

Besides this equipment and miscellaneous assembling and conveyor

CARRIER *does the "IMPOSSIBLE" for the biggest names in industry!*


NO, THIS ISN'T A "FOUNDRY" STORY!
But it does demonstrate the tremendous versatility of Carrier equipment and Carrier engineers. We think that it may give you some new ideas for your own operation.

Ten-foot "shake-down cruise" makes small cartons BIG!

THE boxes on that Carrier Conveyor in the foreground are filled to overflowing with steel fasteners—more than each box will apparently hold, as you can see. As the cartons vibrate along the Carrier Conveyor, the contents are jogged down to fit!

The old system was to fill the boxes to weight, put them on a special jogger, then take them off and roll them to the sealing station—a costly, time-and-labor-consuming operation.

Making jogging an integral part of conveying was downright simple for Carrier engineers. After the 12"-cube boxes are filled and weighed, they are now rolled directly onto the Carrier Conveyor at the rate of 150 per hour. They are quickly joggled and vibrated 10 feet to the sealing station. The whole operation is now quicker, easier, cheaper. In an 8-hour shift, that little ½ HP conveyor shakes down some 3½ million stampings, weighing slightly over 45,000 pounds!

Jogging applications are obviously a natural for Carrier who pioneered and specialize *exclusively* in Natural-Frequency Vibrating Equipment. You'd be surprised at the scores of other, less obvious applications where some unusual processing operation has been combined with conveying. Our Bulletin 112 may give you some ideas for your own business. May we send you a copy?

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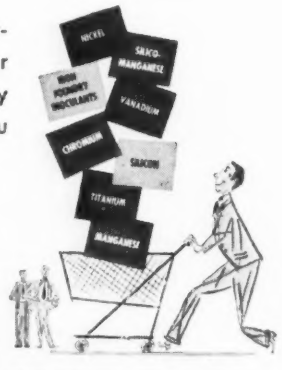

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facilities for the new addition, four semiautomatic molding machines supplied by SPO Inc., Cleveland, will go into existing 300,000 - square - foot building as part of the expansion program.

The new construction will add 8800 square feet to the coreroom, 10,000 to the cleaning room and 2400 to the office building. Though the program will expedite operations at the foundry, plans do not call for an increase in the volume of iron poured.

Cleveland— Ford Cleveland Foundry has started installation of two molding lines which will fill the remaining expansion space planned into the original building. Both lines are expected to be in production in January 1957. Line 9 will make small gray iron parts in green sand molds produced on three cope and three drag, straight through, jolt-squeeze machines. The line is expected to have a capacity of 300 molds an hour.

Line 10 will be a shell molding line, producing crankshafts for six and eight-cylinder engines. Molds will be made on two six-station and two four-station blow machines. A separate sand system at one end of Line 10 will prepare resin-coated sand for the shell molds. To make room for this sand center, the maintenance and pattern shops were moved to a newly constructed addition to the main building behind the coremaking department. Two new, water-cooled cupolas will supply metal for the additional lines.

Within the past two months Ford has put its new automotive hardware plant at Sandusky, O., into production. A die casting department producing miscellaneous parts is included in the operation. Recent rumors to the effect that a shell molding foundry is planned for the Sandusky location are unfounded. It is true, however, that a parcel of land recently was purchased in the area for possible future plant expansion. However, the company has no immediate plans for construction of any kind.

Detroit—Ford Motor Co.'s new multi-million-dollar die casting and permanent mold foundry at Sheffield, Ala., is under construction. It will be known as the Alabama Aluminum Castings Plant and will produce, each day, 140 tons of aluminum parts for engines and automatic transmissions. The plant is expected to be completed late next year and a few operations will start by the end of 1957. Full operation, however, is not scheduled until the fall of 1958.

Molten aluminum for the castings will be moved by ladle truck into the

who 'goofed'?

Rough surface — casting rejected! Time and labor a complete loss . . . all because Molder Mike forgot the PARA-SPRAY.

for "shakeout" success use

PARASPRAY

The modern core and mold surface conditioner with two major "built-in" advantages: 1. Deoxidizes mold cavity atmosphere; 2. Stabilizes moisture content.

Try PARASPRAY in your foundry. Discover the easy, economical way to better, smoother castings. Sample on request.

From your distributor or direct.

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FOUNDRY RUBBER, INC.

Circle 697 on Inquiry Card—Page 255

foundry from the adjoining Reynolds Metals Co. reduction plant now under construction. Reynolds' new plant, part of a group of plants named Listerhill after the Alabama senator, Lister Hill, will have a capacity of 200 million pounds of aluminum annually. Ford plans to use at least 64 million pounds a year.

Molten metal will be received in ten holding furnaces, with total capacity of 560,000 lb, for keeping the metal in molten form. Four additional furnaces will be used for melting trimmings. Power-driven monorail ladle cars will deliver metal from furnaces to five die casting areas and two areas for permanent mold castings.

Philadelphia— While foundry business is active, it is leveling off. This appears to be especially true in gray iron, with operations still holding at around five days a week and backlogs reflecting little change. Producers of heavy castings report order books of eight to ten weeks and of light castings, two to three weeks. Some operators believe that November business may decline because of the fewer working days but hold even with October on a daily basis.

Gray iron requirements for paper making machinery and heavy industrial and electrical equipment are active. While soil pipe specifications are off, pressure pipe needs continue heavy.

Malleable shops are busy on diversified volume of orders, such as for conveyors, pole hardware, industrial fittings, small hand tool work, clamps and marine hardware. Those specializing in pipe fittings continue busy and there is a steady flow of work for the railroads. Most malleable shops are working five to five and a half days a week and have backlogs ranging from seven to nine weeks. Steel foundry activity is holding up well, due in particular to heavy industrial equipment requirements. Backlogs are steady at around eight to ten weeks.

Brass and bronze shops are working on a hand-to-mouth basis, with no backlogs to speak of. In general, it is a rather spotty situation, although most shops are operating at around five days a week, but not always with full working forces. One of the brighter aspects is the stepping up in maritime requirements. Ship propeller business is described as very active; and this uptrend in ship requirements as a whole is expected to continue for some months. Aircraft needs still dominate the aluminum castings field.

TUBES

PERFORATED TUBE
Made from tinplate. Used as substitute for core wire.

FLANGED TUBE
Of plain tinplate, flanged to lock firmly in sand

BUTT JOINT TUBE
Available in lengths up to 6 inches, diameters up to 1 inch. Inquiries invited on other sizes.

Smith & Richardson
MANUFACTURING COMPANY
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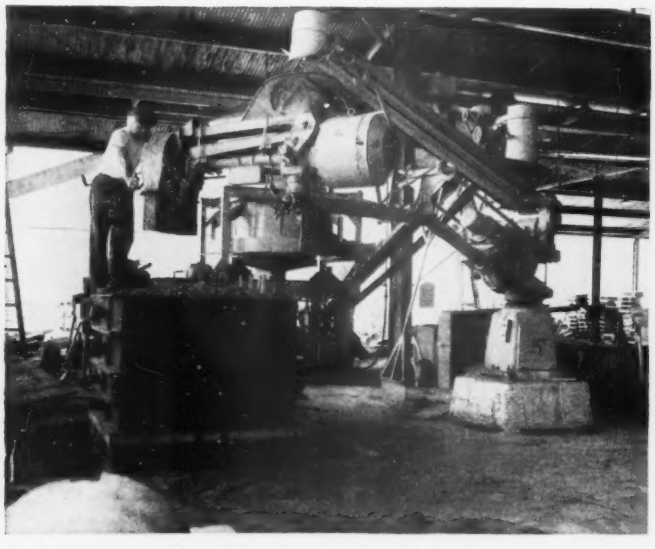
Circle 698 on Inquiry Card—Page 255

Here's how five modern foundries utilize slingers

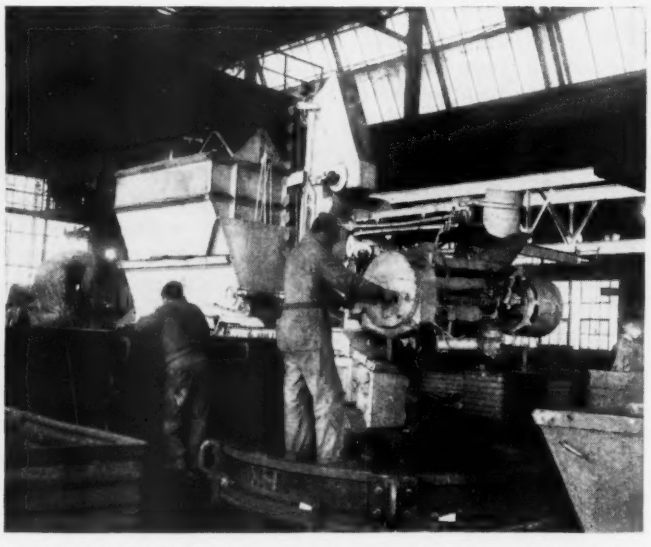
Modern Sandslingers, Hydra-Slingers and Speedslingers are fully adaptable to your molding job. Whether it be a fully rigged production job or a smaller jobbing installation there is a slinger, motive or stationary, especially designed for the application. Here are just a few of the advantages of slinger ramming.

- ✓ The most uniform ramming of any molding method . . . mold hardness is the same over all pattern surfaces.
- ✓ Truer-to-pattern ramming . . . minimum variation in casting dimensions and weights.
- ✓ Fullest flexibility . . . rams all sizes, types and depths of molds. Flexibility unequaled by any other method.
- ✓ No downtime for pattern changes . . . jobbing work can be handled on a production basis.
- ✓ Simplicity of installation and operation unmatched by any other equipment.

THE REALLY BIG ONES — like these ingot molds—are rammed easily by the Stationary Speedslinger or by a Motive Speedslinger. Full mold hardness is attained to depths of ten feet and more.



IDEAL FOR JOBBING FOUNDRY INSTALLATIONS where molds are of medium to medium-large size, the Stationary Sandslinger is one of the most widely used machines.



NO OTHER MACHINE matches the great flexibility of the Motive Sandslinger for jobbing foundry work. Molds of any size . . . patterns of any type . . . are easily handled.

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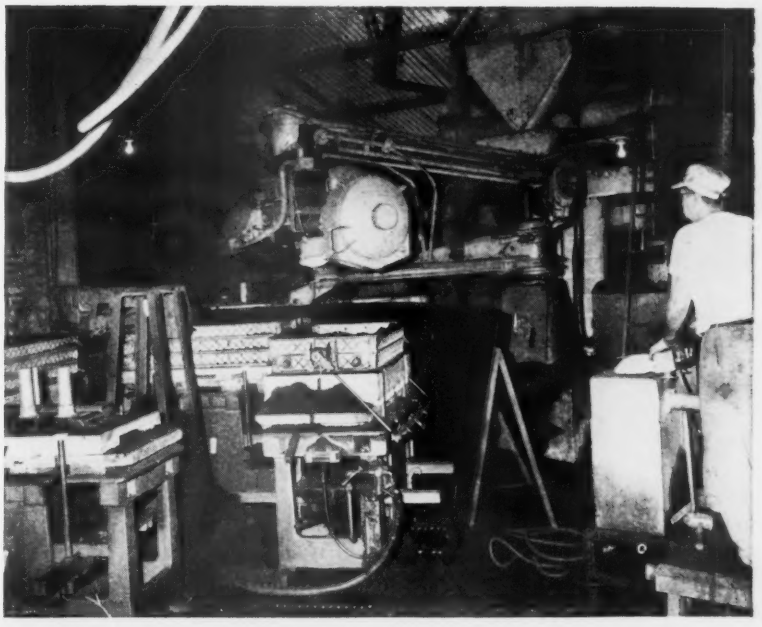
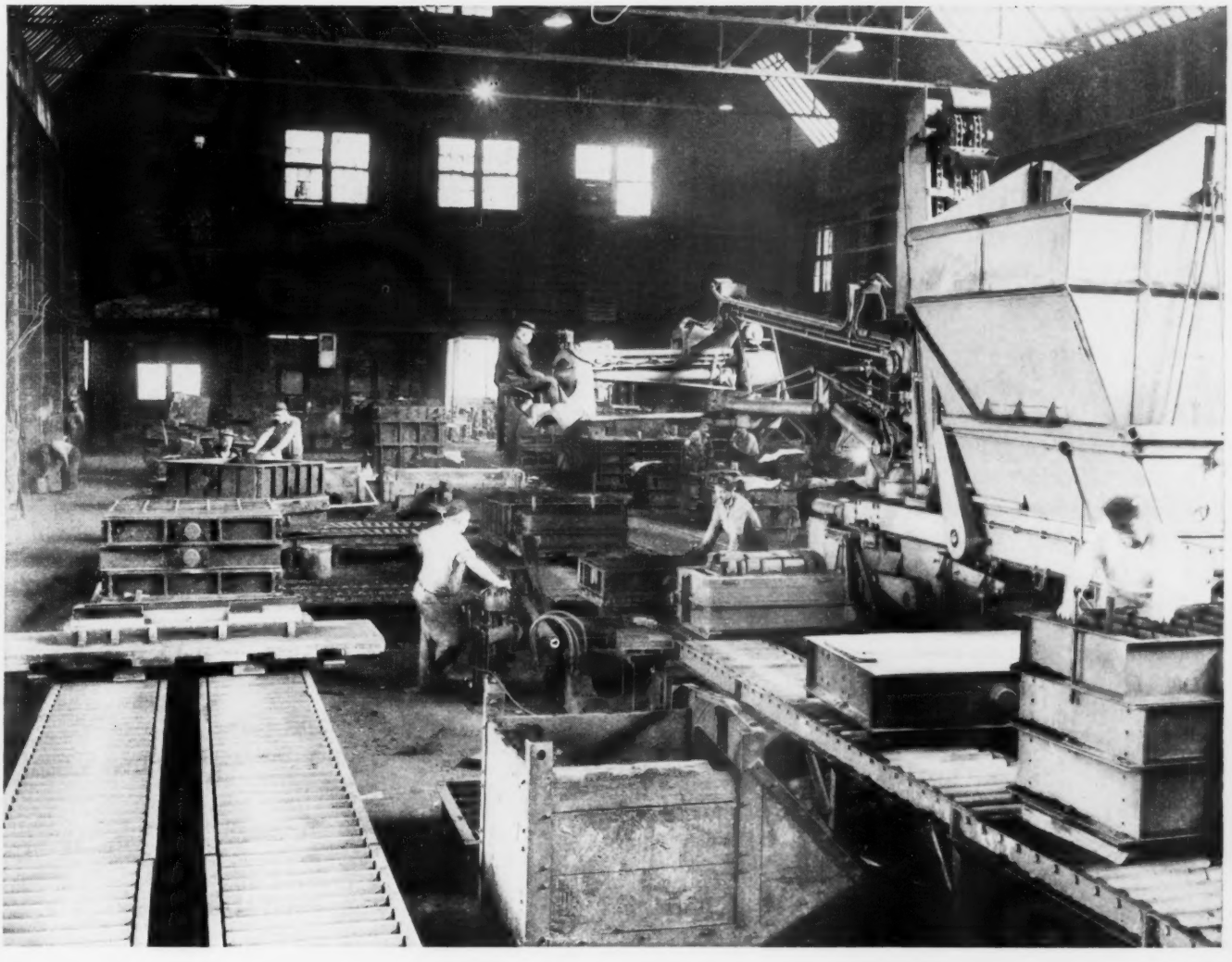
DIVISION PETTIBONE MULLIKEN CORPORATION
2424 NORTH CICERO AVENUE • CHICAGO 39, ILLINOIS

THE NEWEST OF THE SLINGERS — the remote-control Hydra-Slinger — is the most versatile high-speed ramming unit available to foundries. The Hydra-Slinger is equally suitable for fully rigged production units or for flexible jobbing foundry molding units. Remote hydraulic control eliminates fatigue and provides top production and efficiency.



THE BIGGEST OF ALL SLINGERS . . . the Motive Speedslinger. No molding job too big for this high capacity unit. In this foundry conveyor mounted patterns are rammed on one side of the slinger track while large pit and flask work is rammed on the other.



Send for Bulletin No. 320 on Stationary Slingers or for Bulletin No. 1515 on Motive Slingers.

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This pamphlet suggests a simple control solution of blast cleaning operations. So simple an office boy can operate it—does away with "testing" and never interferes with your operations.

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*10% in the case of Permabrasive, 15% in the case of Controlled T

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- ☐ **"It's Triplets" (A Story of Palletizing)**
- ☐ **"Tired of Making Tests?"**

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What You Can Do To Rate And Select Your Foremen

Look for These Things in Supervisory Personnel

By Robley D. Stevens

A FOREMAN ordinarily is delegated authority to manage his department, to maintain good relationships with employees, to settle grievances, to be familiar with company policies and to interpret them to the workers. He also is expected to get production out in accordance with schedules set by his superiors. For all these reasons, he has to be classified as part of the management team.

The problems of a foreman in a small foundry are basically no different from those of a foreman in a large foundry. Both are confronted daily by problems which call for skilled management practices. Ingenuity of the foreman in identifying problems and taking remedial action is a test of his ability to hold down his job.

A periodic supervisory selection and rating program will pay big dividends. It will turn up supervisory talent which otherwise might never have been recognized. Even in a small foundry, persons with good supervisory potentials could be overlooked; in a large foundry, the possibility is magnified. Such a program is a sort of insurance policy against the appointment of men who just can't make the grade as foremen.

Furthermore, a program of this type will bolster the worker's morale. Since that morale is to a large degree dependent upon the quality of supervision, the fewer incompetents appointed to a foreman's job, the better morale should be, other things being equal. More directly, the knowledge that a supervisory selection and rating program is in effect will help relieve the anxiety of employees that they may not get the recognition they merit. Psychologically, it clears up misunderstandings of workers who otherwise would be disappointed in their expectations of a promotion.

In addition, the program helps to speed up the process of filling vacancies by advance evaluation of persons who are eligible. All preliminary work thus is finished and pertinent information available when a selection must be made.

In brief, the program makes it

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- ...ified overnight or over week-...age or appreciable loss

- This ... Furn... AUTO...IC LA...ING ... if desired
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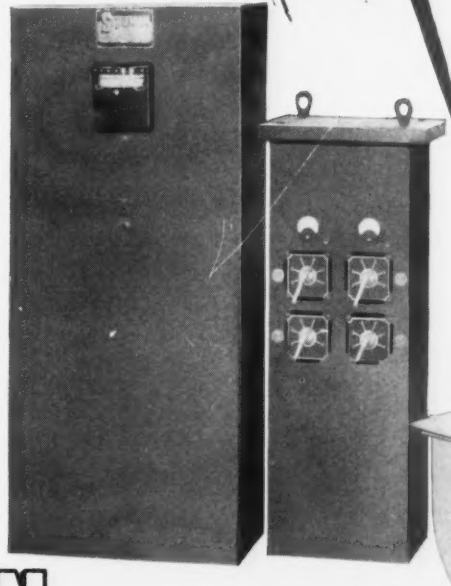

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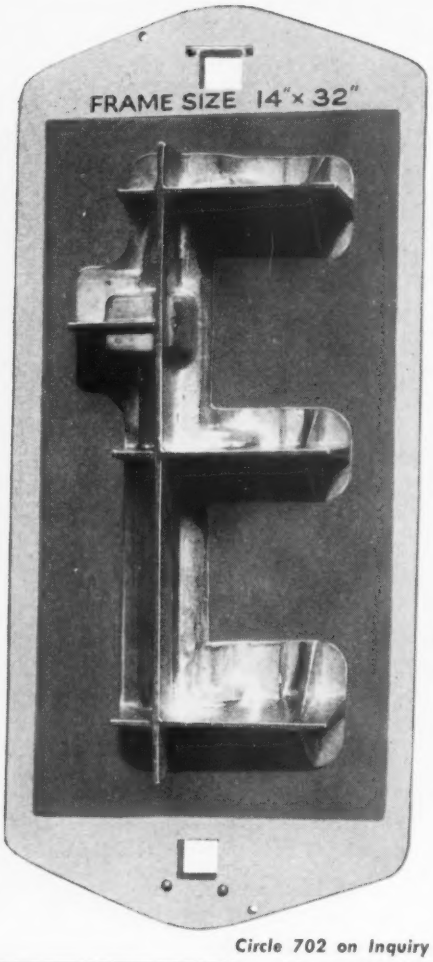

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Columbus, Indiana

The Drier pattern at left is for air intake diesel manifold made from an original master pattern. *Only one skrinkage!* Material is aluminum. Pattern was used for 50 Driers. Only 3 hours labor and 35 pounds of TAMASTONE were required. Up to 1,000 castings have been made from a plate of this type!

No special skill needed to increase production 400% or more! . . . WRITE . . .

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Circle 702 on Inquiry Card—Page 255

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For Better Melting

Circle 703 on Inquiry Card—Page 255

possible to train all foundry personnel who are most promising while they are awaiting consideration for appointment to a foreman's position.

It goes without saying that in any selection and rating program the first step involves job analysis. Unfortunately, in many cases there seems to be a great temptation to try to fill the foreman's job without realizing that anything more than a foreman is needed in the job. Undoubtedly, all supervisory positions have many common elements, yet no two foremen's jobs are identical. The differences are as important as their similarities.

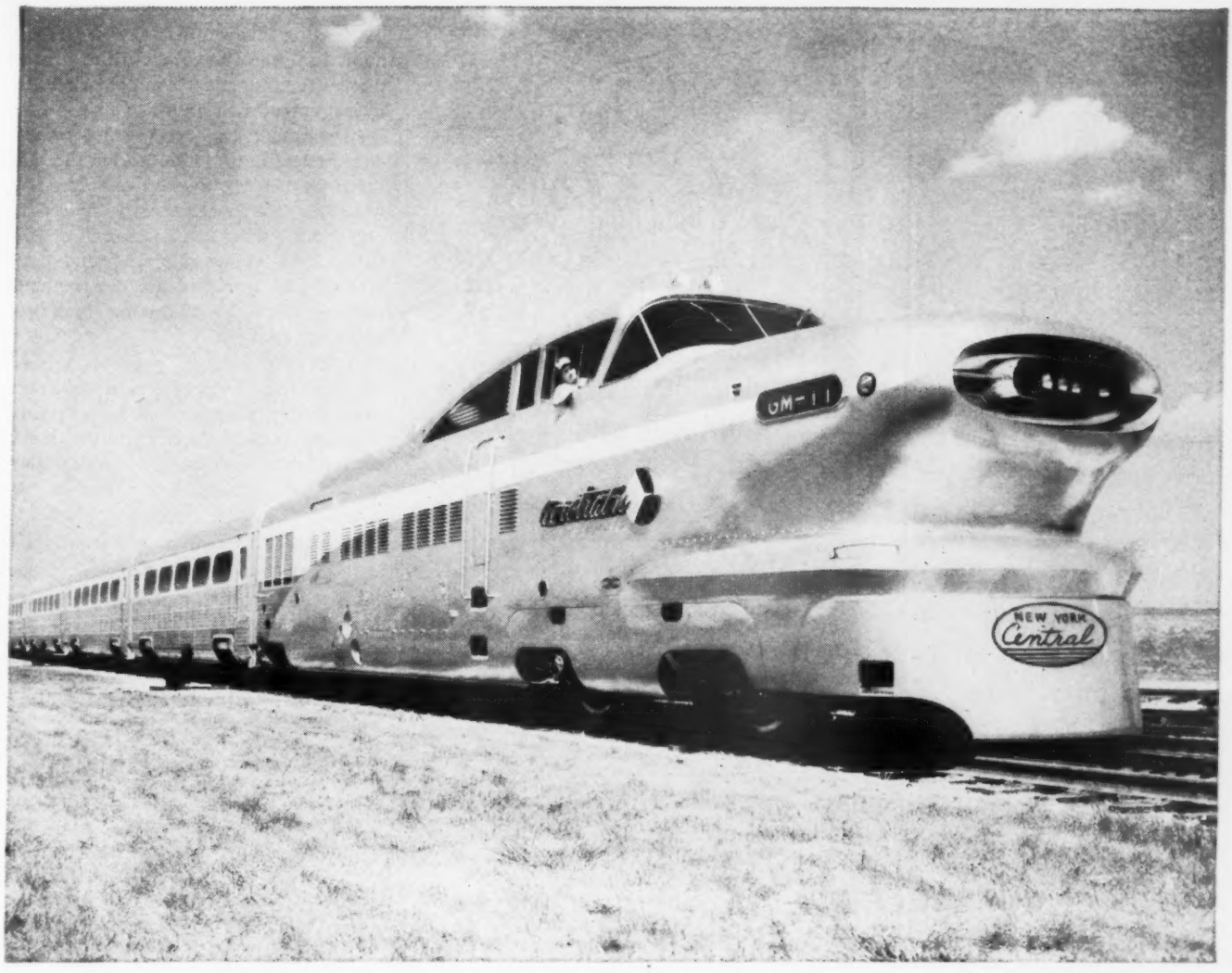
The problem of developing better foremen is more than a matter of putting them through a training course. Even then, the maximum effectiveness of a supervisory training plan may not be successful unless foundry management selects and rates its foremen periodically. There are three basic considerations: 1. The foreman must be qualified for the job. 2. Special selection and rating for his development on the job should be available. 3. The importance of his role as a foreman in the operation of a foundry should be fully recognized.

Choose Foremen More Carefully

Recent surveys indicate that management is becoming more careful in the selection of foremen. Potential supervisors in every firm should possess leadership ability, organizing ability, character, judgment, technical and mechanical skill, initiative, physical capability, etc. The problem is to find qualified prospects. These characteristics and personal qualities have a definite bearing on the growth and development of better supervisors.

When a man in a foundry is promoted from the ranks to be a foreman, he is given evidence that his management is trying to follow the policy of "promotion from within." Preknowledge of this policy provides him with an incentive to display his leadership. It gives him more confidence and encourages him to do a better job. Since more and more employees are looking for jobs that provide career opportunities, they feel that their present company offers the best career possibilities.

Programs for selecting and rating foundry foremen take various forms. In any event, the foreman must possess many qualifications to hold down his job. He must be a responsible person who knows how to interpret management policies to his subordinates since he is a "pipeline" be-



MODERN DESIGN—The New York Central's Aerotrain is typical of the "trains of tomorrow" which went in service this year on the nation's railroads. Castings are vital to such progress.

TRULINE® BINDER KEEPS FOUNDRIES ON SCHEDULE

With many of the nation's foundries working at or near capacity, the important advantages offered by Truline are of special importance.

Throughout the foundry—in the core room, in the molds, in the cleaning room—Truline improves efficiency, reduces man-hours per ton.

Truline's quick bake prevents oven bottlenecks; permits one oven to do almost the work of two. And Truline means strong cores and less breakage. Cores are easily removed by knockout or hydroblast due to Truline's collapsibility.

We'll be glad to discuss the advantages of Truline with you. Write for information:

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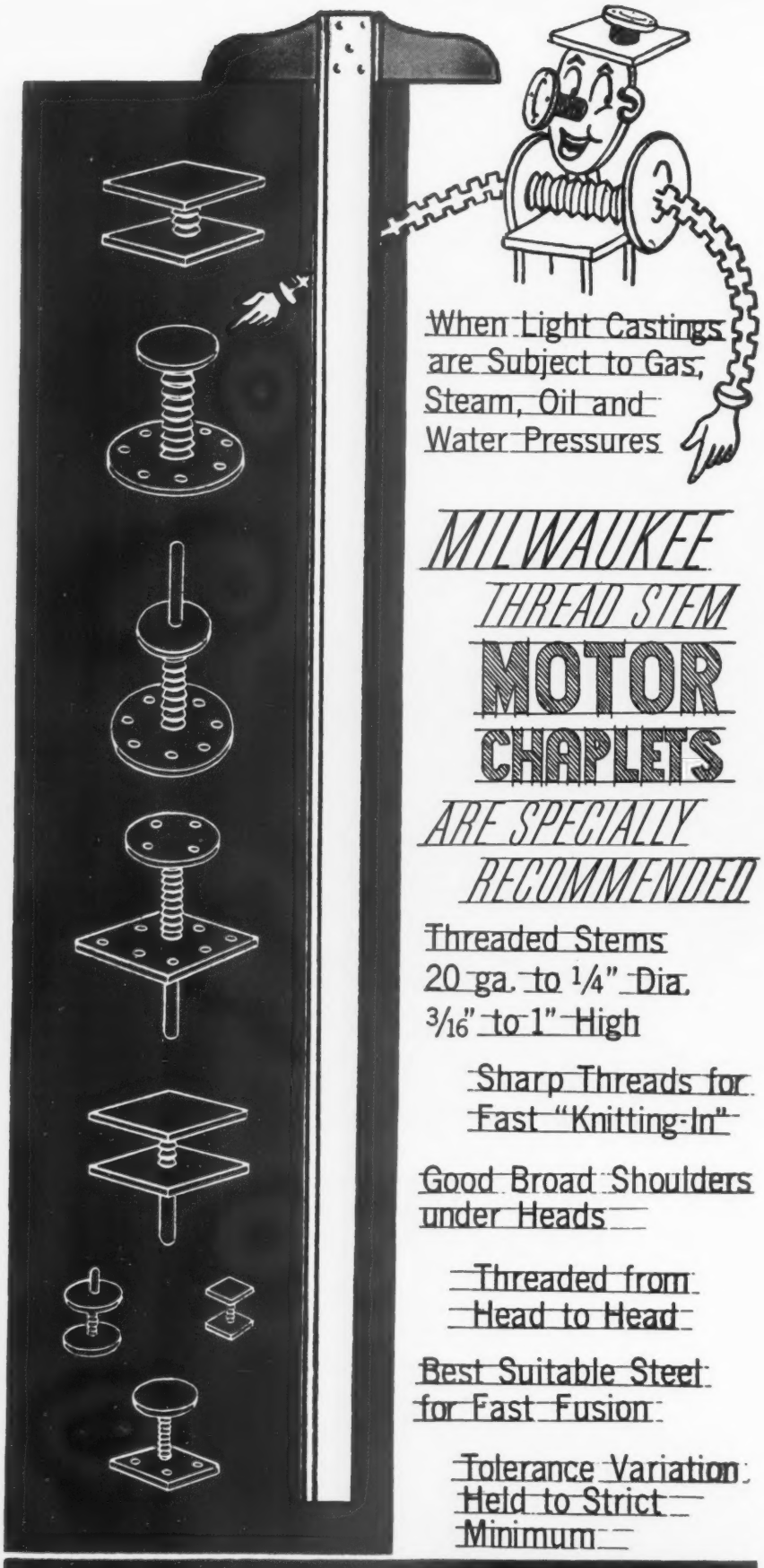
When Light Castings are Subject to Gas, Steam, Oil and Water Pressures
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THREAD STEM
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CHAPLETS
ARE SPECIALLY RECOMMENDED
Threaded Stems
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3/16" to 1" High
Sharp Threads for Fast "Knitting-In"
Good Broad Shoulders under Heads
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Tolerance Variation Held to Strict Minimum
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tween management and labor. In motivating workers, the foreman must select the motivation most likely to influence each worker in management's interest.

In summary, everything a foreman does reflects an act of leadership. He leads by setting a good example, by assisting the workers to overcome any difficulties encountered. He leads by advance planning and control of the work of his department, and he leads by following management procedures.

After the foreman's job has been studied, the next step in a selection and rating program is to evaluate his individual characteristics, work performance, and personal skills necessary to perform the duties of his job.

Develop Foremen with Potentials

It is well known, for example, that a foreman must possess technical knowhow and the ability to handle people. It used to be customary to appoint the best workers to supervisory jobs, with no regard to their ability to get along with others. The current view is to develop supervisors with full potentials. Of course, if the job supervised is too complex, he should not be in it.

In any event, management experts agree that every foundry foreman should have the desire to lead because it is an important component of ability to deal with the workers. The foreman's recognition of his own fallibility also is important. An arrogant foreman engenders resentment in his department. Obviously, integrity is required of every foreman. Emotional stability is an important quality which management must demand. Patience is essential to the effective conduct of his job. In addition, tact serves as a lubricant in interpersonnel relations and must be exercised by the foreman. Good judgment in all facets of his job is vital. In short, the job of a foreman is so demanding and so varied that he must keep pace with these qualifications.

The final question that arises is this: How is management to find out which individuals have the desirable characteristics and qualities and to what extent? Many of the answers may be obtained from the following checklist.

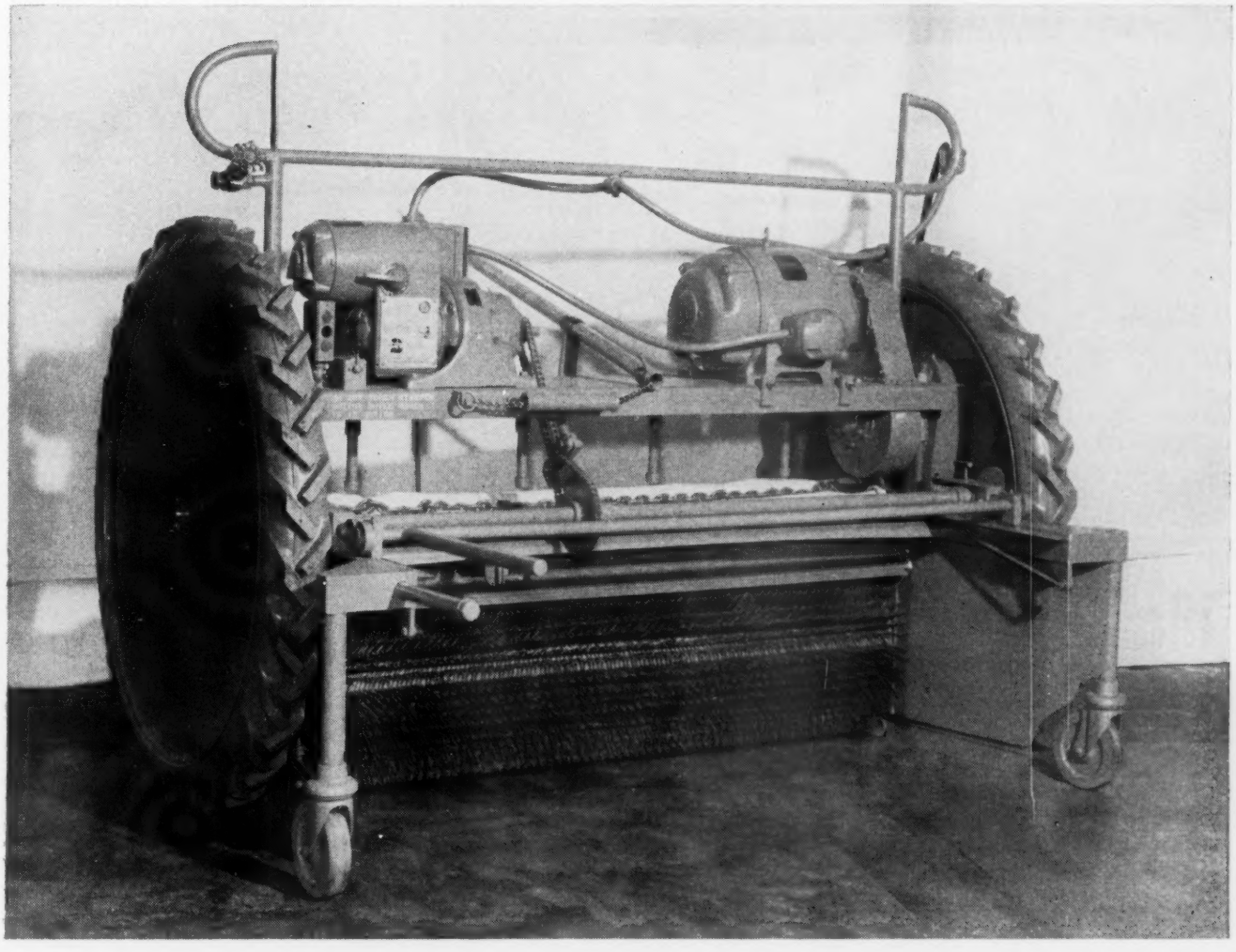
Foreman's Self-Analysis Chart

1. *Understanding My Company:*

I know the functions of my department and how they contribute to total company policy.

I show every worker under me his job and how it fits into the over-

IN TUNE WITH THE TIMES
WITH *"The Moulders' Friend"*



Costs rise higher and higher every year. To keep in tune with the times we must find cheaper ways to do the job better.

Foundrymen who use The Moulder's Friend sand conditioner agree that the thousands of flat tempered steel wires in the brush revolving at high speed do the most thorough job of mixing and aerating sand heaps on the foundry floor.

The Moulders' Friend is completely self-propelled. It has a capacity of two tons of thoroughly conditioned sand per minute with travel speeds up to 50 feet per minute. One man does the job.

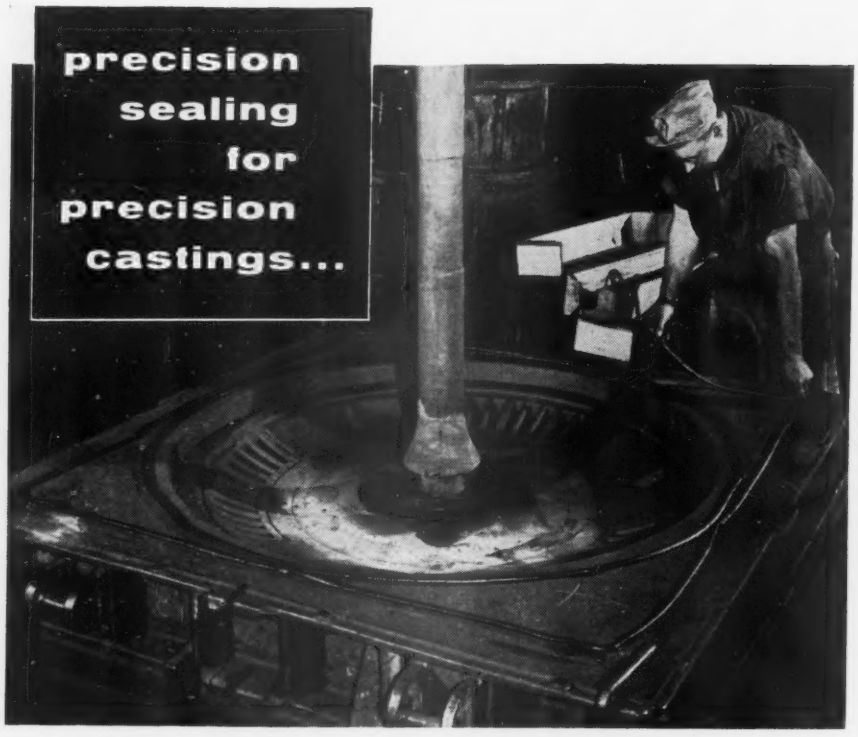
A screen for removing trash and tramp iron and a water dispenser for accurately wetting down the sand as the machine travels over the heap are valuable added features.

The Moulders' Friend fits your foundry. Being carried on two large wheels it turns short and handles well in the crowded foundry.

The Moulders' Friend will help you keep in tune with the times by paying for itself with better castings and less labor cost. Investigate this remarkable machine today. See one in operation. Valuable information is yours for the asking. Please write for bulletin F.

THE BRUSH DOES THE JOB

"The Moulders' Friend" ● Dallas City, Illinois



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COPE and DRAG SEALER

FASTER...EASIER...BETTER
than mud or dough rolls!

READY TO USE! *No time-consuming mixing. Handy 30" beads in diameters from 3/16" to 3/4"*

POSITIVE SEATING! *Permits accurate measurement of metal thickness.*

ELIMINATES RUN-OUTS! *Note in photo how close KopeSeal comes to edge of impression.*

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■ ***Ask your distributor for working sample***

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Montreal, Que.—Geo. F. Pettinos (Canada) Ltd.

KOPEROPE: *Harrison, N. J.—Springfield Facing, Inc.*
Milwaukee, Wisc.—Milwaukee Chaplet & Supply Corp.

PRESSTITE Sealing Compounds
PRESSTITE-KEYSTONE ENGINEERING PRODUCTS COMPANY
K A P

A Division of AMERICAN-MARIETTA COMPANY
3738 CHOUTEAU AVENUE, ST. LOUIS 10, MISSOURI

all picture of the management.

I understand my lines of authority and responsibility.

I recommend the number and type of skilled workers needed in my department.

I endeavor to make logical work assignments based on company outlines of responsibility.

2. *Getting Out the Work:*
I give directions to workers which are clear, understandable and specific.

I periodically review work progress in my department.

I know how to co-ordinate all jobs in my department and take action as necessary to meet schedules.

I inform workers of what rightfully is expected of them by management.

In all my supervisory activities I emphasize control of cost and worker utilization and use management shop budgets for cost control purposes.

3. *Planning and Scheduling:*
I keep up with the work capability of my department.

I plan for the best use of manpower, materials, equipment and space in my department.

I plan to meet deadlines and to eliminate overtime work.

4. *Improving Work Methods:*
I analyze all operations of my department and co-operate with the industrial engineer in developing and applying new, improved methods.

I encourage submission of employee suggestions.

5. *Determining Performance Requirements:*
I inform each worker what our management expects of him.

I evaluate objectively each worker's performance based on company requirements.

6. *Developing Workers:*
I recommend proper selection of every worker to the personnel department.

I aid every worker to adjust on a new job.

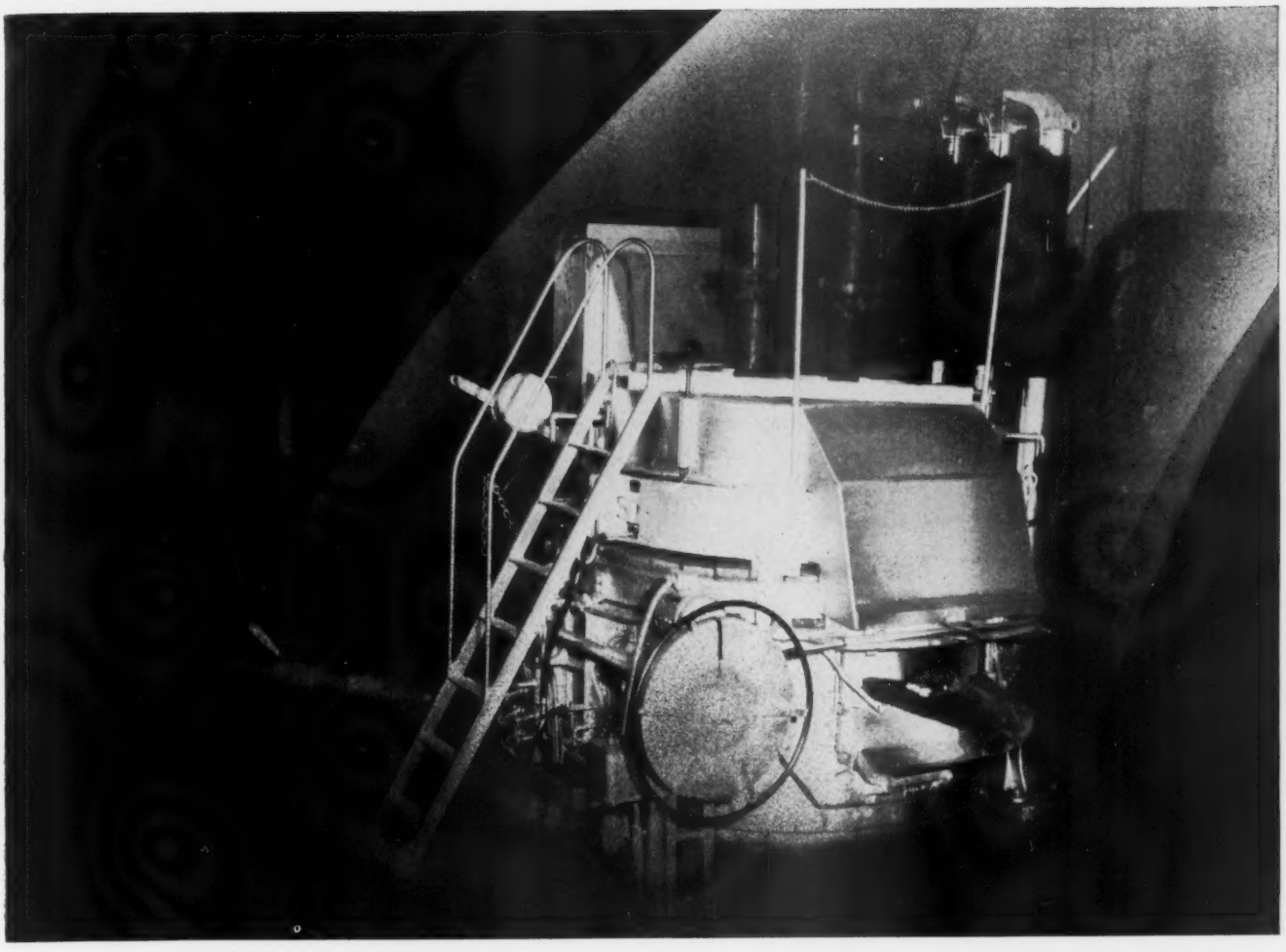
I place every worker on those phases of the operation where he can do the most effective work.

I advise the workers how they actually are doing according to company policy.

I recommend career opportunities to all new employees.

7. *Maintaining Co-operation:*
I suggest to management that it

Circle 707 on Inquiry Card—Page 255



DUSTUBE erases fume problems

quickly, simply and at low cost

With Wheelabrator Dustube dust collectors, electric furnace ventilation and fume control is no more complicated than the ordinary dust control application and the cost is surprisingly low.

Using Orlon filter fabric, Wheelabrator engineers have successfully adapted the Dustube tubular type cloth filter for eliminating all visible solids from electric furnace ventilation air.

Even a knotty problem involving two furnaces at Sawbrook Steel Castings Company (above) has been solved by a Wheelabrator Dustube installation.

At Sawbrook, a 4-compartment, continuous automatic collector ventilates two electric furnaces through use of 7′ 6″ diameter roof top hoods. No fume escapes the hoods and discharge from the collector is free from visible solids even during oxygen lancing. Sawbrook collects about 300 lbs. of dust a day.

Although original gas temperature may reach 520° F. at furnace hoods, the final mixture, by the time it reaches the Orlon tubes, is below the safe temperature limit of 275 degrees. Orlon withstands ozone in the fumes, too.

Simple in design, construction and operation, Dustube regularly provides collection efficiencies of 99% and higher. For more details on how Dustube can help you, write today for Bulletin 372.

WHEELABRATOR
CORPORATION

505 South Byrkit Street
Mishawaka, Indiana

Circle 708 on Inquiry Card—Page 255

Quality starts in the furnace!

Jenkins Bros. uses nine Detroit ROCKING Electric Furnaces to melt bronze for valves

Top grade valves require top quality castings. And top quality castings require metal that is *right.*

Jenkins Bros., makers of fine valves for almost a century, have 9 Detroit Rocking Electric Furnaces, with a combined capacity of 7700 lbs. per hour, to melt bronze of the necessary high quality.

PRECISE CONTROL OF ANALYSIS—Melt-analysis can be controlled very exactly in these great furnaces, with metal of the desired characteristics produced in heat after heat. Accurate temperature control allows establishment of the most advantageous pattern for operation, and duplication of that pattern for each melting cycle. The rocking action of the furnaces assures homogeneous melts and a more complete utilization of generated heat because of the flow of molten metal back and forth on the lining.

NOTE THESE ADVANTAGES—Other important advantages of Detroit Rocking Electric Furnaces are economy of power consumption, minimum heat loss, less metal shrinkage, fewer scrap castings, more heats per shift or working day, reduced out-of-production time because of long refractory wear and simple shell replacement, trouble-free operation.

Detroit Electric Furnaces range from 10 lbs. to 4000 lbs. capacity, individually designed to fit your plant's electrical specifications. They melt ferrous and non-ferrous metals with equal efficiency.

GET FULL INFORMATION—For full information on the advantages of Detroit Electric Furnaces for your foundry, send us your operating data. We'll give you full details. Write today.

DETROIT ELECTRIC FURNACE DIVISION

Kuhlman Electric Company • Bay City, Michigan

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N.Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D.F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

reward every worker for jobs well done.

I transfer and reassign workers for the best use of their abilities in the firm's interest.

I try to earn every worker's confidence and loyalty.

I keep workers informed on getting production out on time, seek work simplification plans and encourage workers to hold production costs down.

8. *Self-Improvement:*

I am aware of my shortcomings, try to improve my technical knowledge and skills and my ability to get along with people.

I attend management supervisory conferences regularly, and develop a good attitude toward my job.

I adopt a friendly attitude toward my associates, work hard, show initiative and respond positively to suggestions.

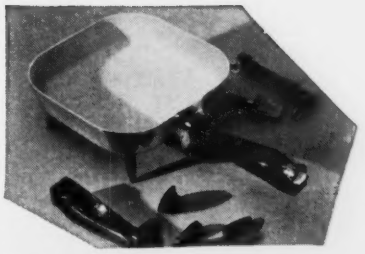
I understand my duties as a foreman and my working relationships with management.

Catalog Covers Mechanical Power Transmission Products

A new engineering catalog covering its complete line of mechanical power transmission products has been published by Dodge Mfg. Corp., Mishawaka, Ind. It contains 328 pages of helpful information on the firm's products, including sectional drawings, dimensions, weights, prices, application details and engineering tables. Eight pages are devoted to a detailed index of all material in the catalog. Copies for key personnel are being furnished to industry by authorized Dodge Mfg. Corp. distributors.

"We've decided on a little shuffle in management, Wilkins. How much do you remember about pouring?"

Shell molded fry pan has



CAST-IN HEATER

DUREZ FOUNDRY RESIN *helps do the "impossible"*

You never know what new trails you can blaze with shell molding until you really investigate it. People less familiar with the method than Art Foster, president of Foster Aluminum Alloy Products Corp., told him he couldn't cast the electric unit into this fry pan as part of the shell molding operation.

Not only did he succeed, but Durez phenolic resins are helping him to get maximum benefits from the process. Dimensions are so accurate there is practically no machining—just polishing. Molding machines are operated by relatively inexperienced help. The cost of producing top-quality castings is lower all along the line. Incidentally the legs, handle, and cover knob are molded of Durez phenolic plastic.

May we show you what a difference Durez foundry resins can make in profitable shell molding? Our broad experience in working with foundries is at your command

TO KEEP IN TOUCH *with shell mold developments, use the coupon for our helpful bulletins.*

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DUREZ PLASTICS DIVISION
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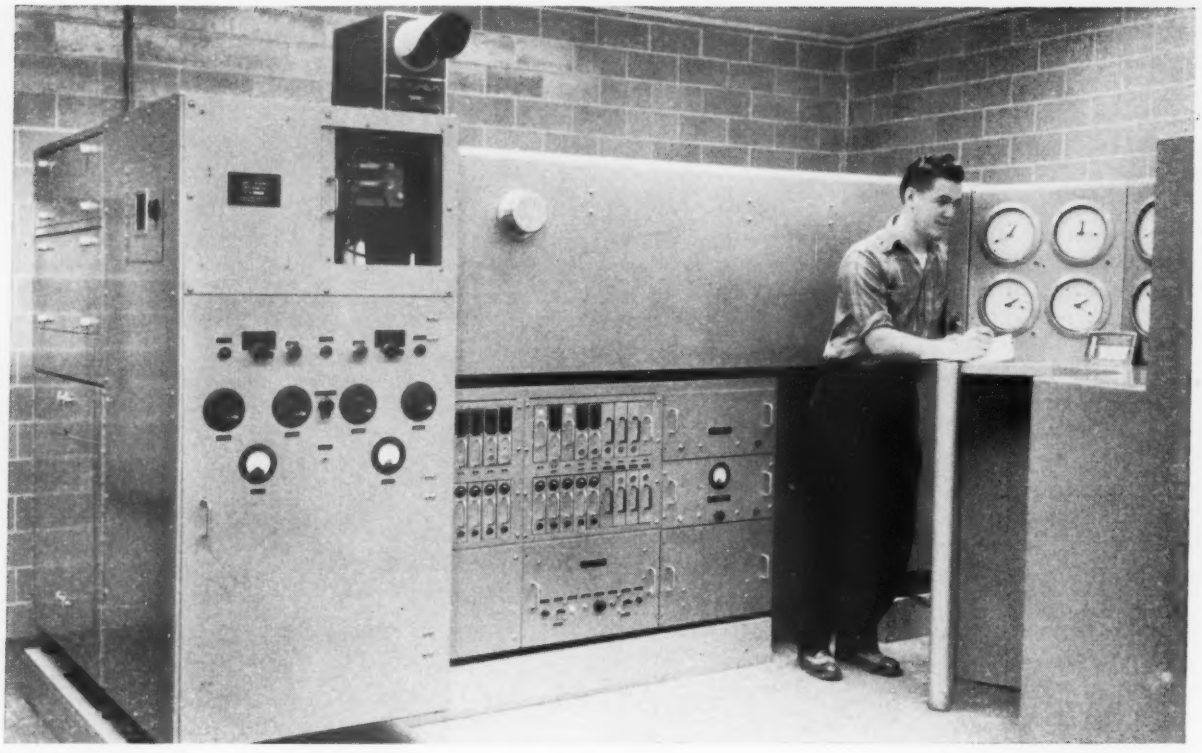


Direct reading spectrometer has enabled control engineers at Janney Cylinder Co. to achieve new speed and efficiency in analysis of melts

Spectrometer Improves Melting Analysis Control

THE problem of maintaining high efficiency in melting analysis control while casting over 50 different types of ferrous and nonferrous alloys has been solved successfully by one of the country's pioneers in development and application of centrifugal castings.

Janney Cylinder Co., Philadelphia, processes some million pounds of alloys each month into a wide variety of finish machined products. The firm works largely with such materials as stainless steels, alloy irons, ductile iron and Ni-Resist Irons, brasses, bronzes, monel metal and beryllium coppers. In addition, some centrifugal casting is done with precipitation hardening stainless steels and various special steels used in aircraft gas turbines. This diversity of raw materials emphasises the need for effective melting control.

Focal point of the company's melting control department is its direct reading spectrometer. This instrument, manufactured by Baird Associates-Atomic Instrument Co., Cambridge, Mass., is installed in a 20 x 20-ft laboratory. It permits over 500 determinations to be made in an eight-hour shift. Prior to setting up this facility, the company obtained approximately the same results, but manpower requirements were much greater and floor space for a wet chemistry laboratory was four times that of the present spectrometer installation.

Because of the number of different metals involved in Janney production, speed of analysis early in the casting process is of utmost importance to control quality. Former methods of control, the company points out, provided analytical results too late to make any changes, necessitating the scrapping of entire heats.

With the spectrometer, analysis of heats is relatively simple. The sample is taken from the melt and sent, either in cast rod, disk or other standard form, to the spectrometer laboratory. The instrument operator prepares the sample, places it in the spectrometer, pushes a button and, almost by the time he picks up his pad, the information is ready to be recorded. The data, in per cent concentration, appear on the recording dials of the instrument. The report is sent back by phone or telautograph. Total time—less than 5 minutes.

The Janney unit was especially aligned and calibrated to suit the company's analytical problems. Appropriate spectrum lines were selected carefully, based on types of metals to be tested. Standard samples of known concentration were run on the instrument, with results plotted on a linear time scale versus per cent concentration on a log scale.

Standard samples were run again following installation of the instrument, with the results once more plotted on semi-log graph paper.

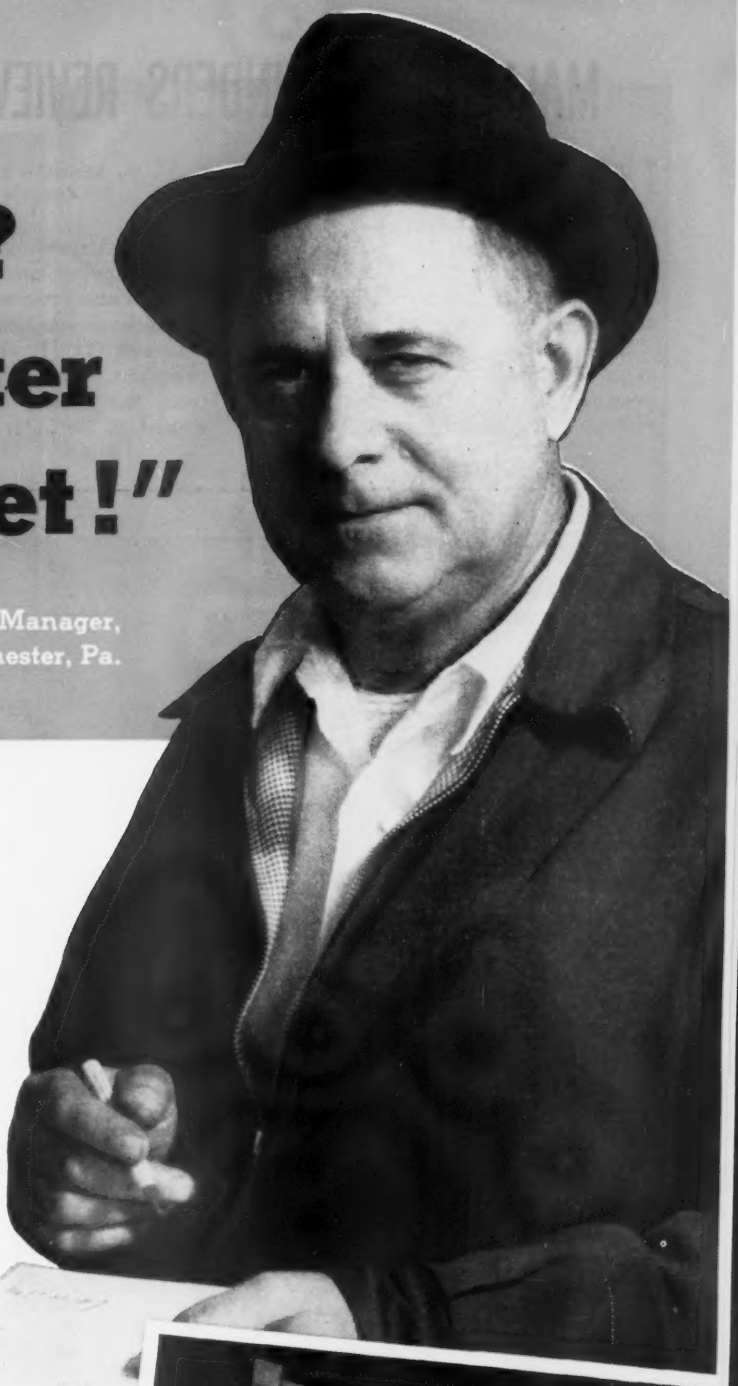
On the basis of these curves, dials were calibrated in per cent concentration. These "direct-reading" dials were then mounted in the instrument and samples began to flow through the laboratory.

According to Philip P. Jefferis, assistant to the president of Janney Cylinder, the increased speed of metal analysis has resulted in an over-all gain in unit output as well as greatly expedited shipments.

He notes further that had the company not set up its spectrometer facility, an extensive training program for laboratory assistants would have been needed to handle the increased volume of routine analyses brought about by additional new business, thereby adding to operating overhead.

"Pangborn Blastmaster? Nothing better on the market!"

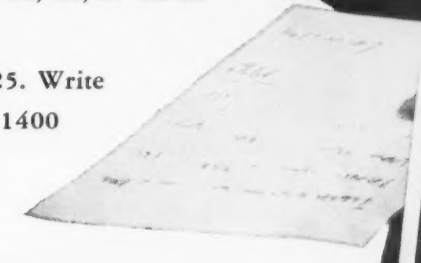
says WILLIAM BURROWS, Plant Manager,
The Atlantic Steel Castings Co., Chester, Pa.



"When we needed new blast equipment," says William Burrows, "we checked around. We found that the Pangborn Blastmaster Barrel had *more* advantages—more of the things that add up to a good deal for The Atlantic Steel Castings Co. Our Pangborn is one of the best things we ever invested our money in."

Blast cleaning can represent a sizable investment. If you're in the market, you would be wise to compare the Blastmaster Barrel against competitive makes. The Blastmaster is tailored to individual requirements in sizes of 1½, 3, 6, 12, 18, 27 cu. ft. Many exclusive features.

For details, send for Bulletin 225. Write to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland.



Because of this 27 cu. ft. Blastmaster and other Pangborn equipment, Atlantic has cut cleaning time from two full 8-hour shifts (16 hours every day) to only *six* hours. To achieve peak cleaning efficiency, this size Blastmaster uses *two* Rotoblast units for *double* hot spots in cleaning area.

Pangborn®

blast cleans cheaper

Circle 711 on Inquiry Card—Page 255

MALLEABLE FOUNDERS REVIEW INDUSTRY DEVELOPMENTS

By KENNETH L. MOUNTAIN
Associate Editor

TOPICS of general interest and a review of what has happened within the industry during the summer months highlighted the fall meeting of the Malleable Founders' Society, held at Hotel Cleveland, Cleveland, on September 21.

Leon J. Wise, vice president, Chicago Malleable Castings Co., and president of the society, presided and reviewed the society activities since its annual meeting in June. Reports from standing committees were summarized and progress in several fields of endeavor was charted.

Lowell D. Ryan, executive vice president, read a memorial tribute from the society to the memory of Robert E. Belt. Mr. Belt, who retired in 1946 after serving the society for 30 years as secretary-treasurer, died July 25.

Dr. Lauriston D. Marshall, director of research, Link-Belt Co., elaborated upon Project IV at Purdue University—basic research on the behavior of the malleable complex to gain a fundamental, basic knowledge of all the properties that go into the making of malleable iron. End result will be a better understanding of malleable iron so that additional applications can be found to use the metal in its full potential. Other work under study includes stress-rupture data on low and high carbon malleable at elevated temperatures.

Roger W. Griswold, Erie Malleable Iron Co., Erie, Pa., James Williams, National Malleable & Steel Castings Co., Cleveland, Paul Greene, General Electric Co., Erie, Pa., and Fred Lavender, Ironton Malleable Division, Dayton Malleable Iron Co., Ironton, O., reported upon the use made and benefits received from utilizing the society's research findings in their own plants.

Summarizes Gating and Feeding Data

George A. Meyer Jr., shop practice engineer, presented a resume of the Part V report on gating and feeding and emphasized that super personnel were not needed to establish the recommended procedures. He suggested that the curves contained in the report might be high as the etch method was used rather than x-ray or microscope techniques.

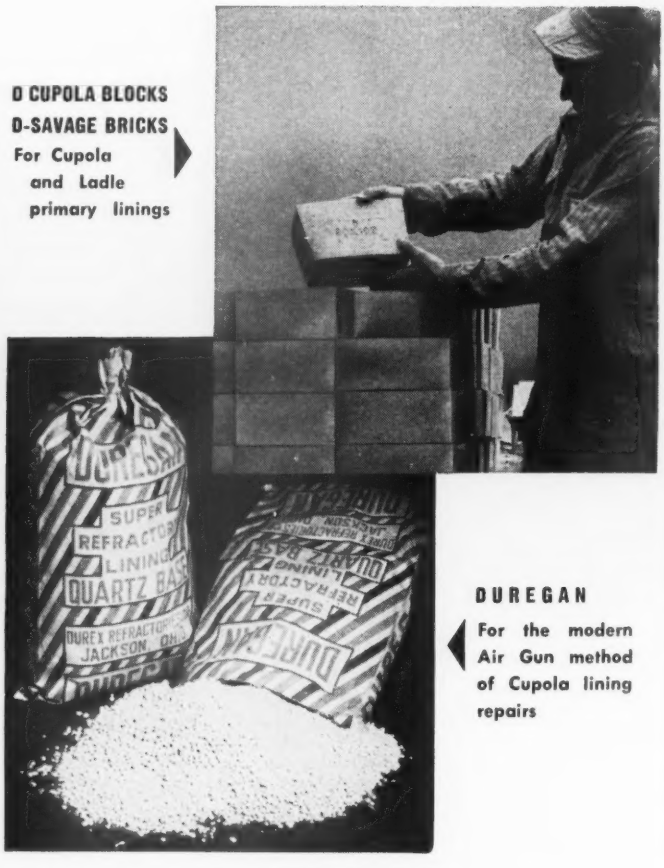
James H. Lansing, technical and research director, reported on recent technical developments with emphasis on the society's continuing efforts to advance the use and acceptance of malleable castings where applicable.

Mr. Ryan presented some ideas concerning "Wages and Productivity in the Malleable Industry." He reviewed the nature and amounts of wage increases resulting from the basic steel wage settlement and presented a comparison of the malleable industry with the national industrial productivity increases. The study indicated that there has been a substantial reduction in recent years of the man-hours required to produce and ship a ton of malleable castings; to remain competitive, however, the malleable industry will have to continue to improve its productivity.

Fred Head, administrative assistant, briefly presented the basic data of a five-year plan proposed by the National Association of Manufacturers for a systematic reduction of income taxes to a top figure of 35 per cent. This reduction would take place over a five-year period.

DUREX

D CUPOLA BLOCKS
D-SAVAGE BRICKS
For Cupola and Ladle primary linings

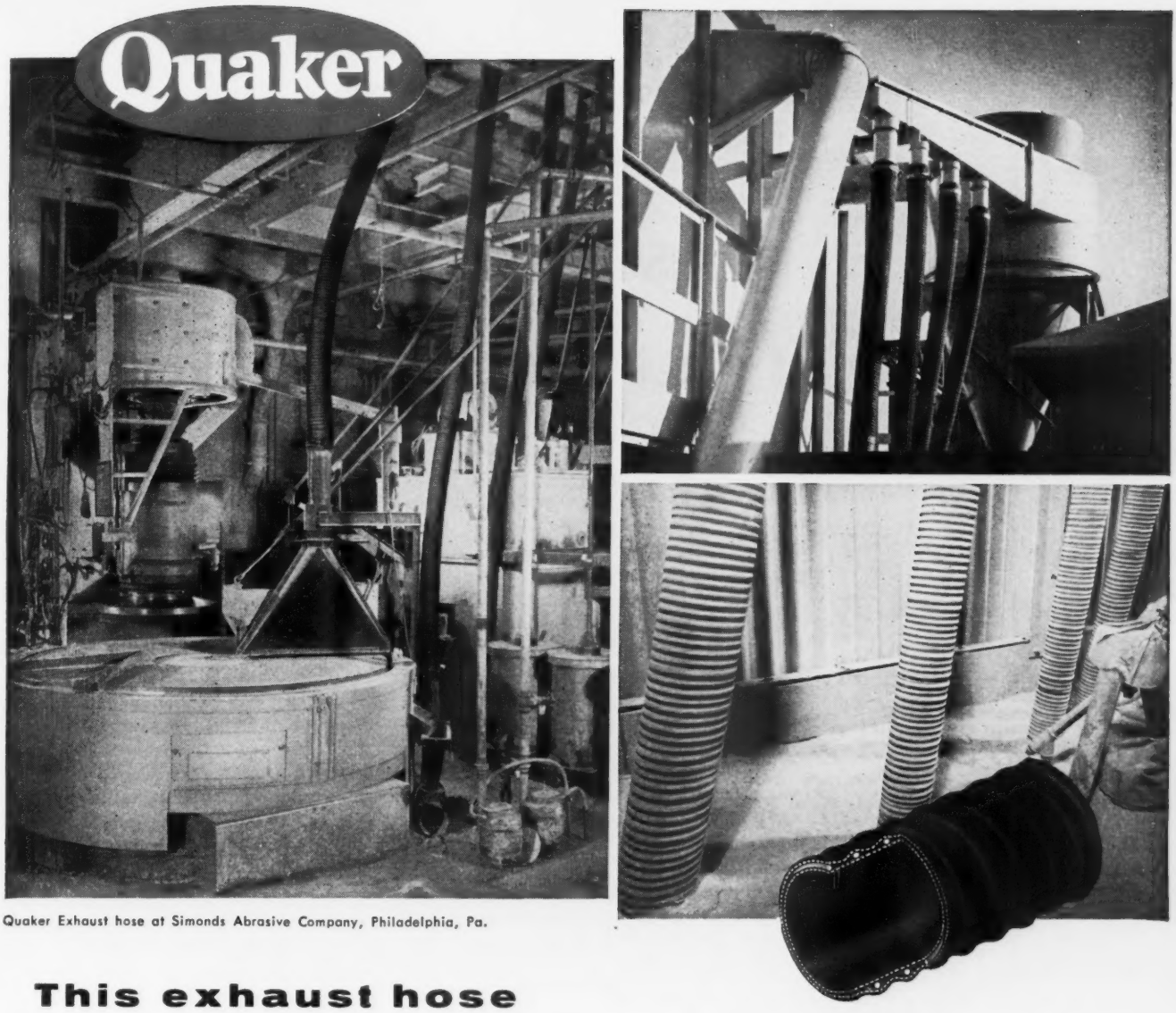


DUREGAN
For the modern Air Gun method of Cupola lining repairs

can furnish **BOTH**
cupola blocks and gun material

Both the primary lining and the modern air placement repair material, can be furnished from our plant in the same carload. Our ability to furnish *both* of these distinctly different products from the same plant, enables individual foundries to minimize their inventories without necessitating l.c.l. shipments at higher costs.

DUREX
REFRACTORIES CO.
JACKSON, OHIO



Quaker Exhaust hose at Simonds Abrasive Company, Philadelphia, Pa.

This exhaust hose already 4 times longer lasting in this grinding wheel plant...

Your Quaker-Quaker Pioneer distributor can supply not only your standard needs —but also your highly specialized ones. You'll find him a prompt dependable money-saving source for everything you need in rubber products. Write for free brochure and name of your nearest distributor.

Continuous handling of abrasive dust and steel shot calls for an exhaust hose of proven stamina. This Quaker hose has it. Even after 6 months of steady use by this grinding wheel manufacturer, it is still standing up to the wearing effects of abrasive particles—as compared to 6 weeks service by previously-used hose. It is specifically made for such tough service. Tube is specially compounded abrasive-resistant stock. Extra strength is provided by two plies of sturdy fabric and a helix of flat steel wire. Cover resists aging and is corrugated to give ready flexibility for bending around sharp corners. In lengths up to 50 feet. For lasting service specify Quaker-Quaker Pioneer exhaust hose.

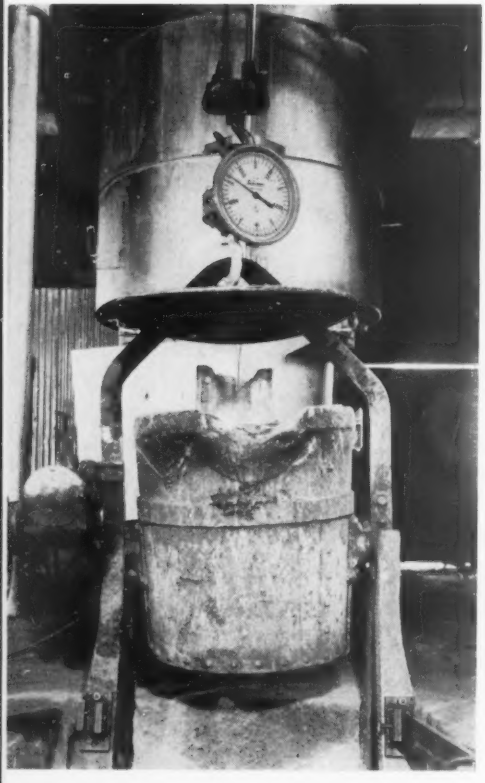
H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION
Philadelphia 24, Pa.

HKP

QUAKER PIONEER RUBBER DIVISION
Pittsburg, Calif.

Hook scale shown here is used to weigh molten aluminum tapped into the ladle prior to pouring



To protect scale from intense heat, steel and asbestos shield between molten metal and scale is suggested in a steel foundry

HOOK SCALE

Facilitates Accurate

CASTING PRODUCTION

By GILBERT C. CLOSE

A HEAVY-DUTY yet extremely accurate industrial-type hook scale is saving thousands of dollars annually in the foundry at Pioneer Aluminum Inc., Los Angeles, claimed to be the world's largest manufacturer of cast aluminum jig and tool plates. The scale is used to weigh the molten aluminum when it is tapped from the furnace into the ladle.

The jig and tool plates are produced to very close tolerances, using special 921-T aluminum casting alloy. They are poured in large open-top permanent molds. After casting, each plate must be rough-machined, then milled until it is flat to within 0.010-in. over any 8-ft distance, and is within plus-or-minus 0.010-in. of the required thickness.

Before the use of the hook scale, errors were often made in the amount of molten aluminum poured to produce a plate. When too little was poured to allow for the finish machining operations, the plate had to be scrapped for remelt; when too much was poured, excessive machine work was required to bring the plate within the necessary tolerances.

To eliminate these costly errors, the heavy-duty hook scale was installed between the hoist and the ladle into which the molten aluminum was tapped prior to pouring. A Martin-Decker SU-20 Sensater hook scale was chosen because of its accuracy, which is not affected by radical temperature changes.

Installation of the hook scale was very simple. Only 18½ in. of head room was required between the hoist and ladle hooks. The scale weighs about 70 lb and is equipped with a plastic dial plate cover that withstands heat and will not break from a sudden accidental blow.

After installation of the scale, a chart was developed showing the exact weight of molten aluminum required for tooling plates of different sizes and thicknesses. Now, when the operator is ready to tap the huge 44,000-lb furnace, he merely consults the chart to determine the exact amount of metal required, then proceeds accordingly. To compensate for the weight of the ladle, and thus eliminate possible confusion, the scale dial is "zeroed" on the tare weight adjustment prior to tapping.

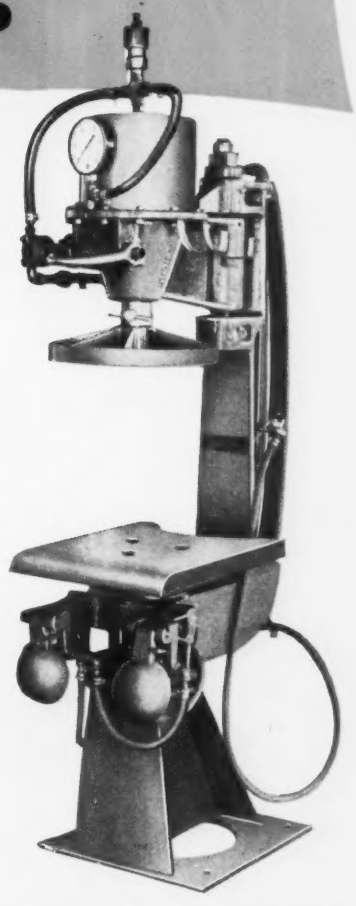
John Pivovaroff, plant superintendent, points out that tooling plates up to 12 x 24 ft in size have been cast. These large plates require several ladles full of molten aluminum. But by carefully weighing each ladle, the final plate is just the right size.

As illustrated, installation of the hook scale is simple. Less than 20 in. of head room is required between hoist and ladle

TABOR TOP-SQUEEZER

With or without jolt

NO. 210



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- For ease and speed of operation, swing head is ball-thrust-bearing-mounted. When squeeze pressure is applied against the head, load automatically removes from thrust bearing.
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- No piston rings on squeeze mechanism . . . no need to re-bore or replace squeeze cylinder.
- Conveniently-located gauge records exact pressure. Optional squeeze pressure release valve assures uniform density on similar molds.

The Tabor Top-Squeeze Machine No. 210 is just one member of the complete line of Tabor Foundry Molding Machines and Tabor-Brasive Cutoff Machines. The Tabor man — the technical man — will be glad to arrange a demonstration for you at our plant. Or send you detailed data.

Tabor No. 210 Top-Squeeze Stationary Machine. Table size, 16" x 19". Squeeze cylinder, 10" dia. Squeeze pressure release valve optional.

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Circle 714 on Inquiry Card—Page 255

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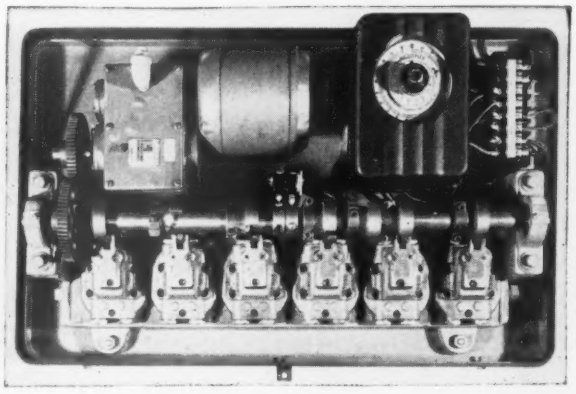

Time Guide with light panel removed. Air valves operate at full line pressure from rotating cam. Adjustable cams key mixer through complete cycle.

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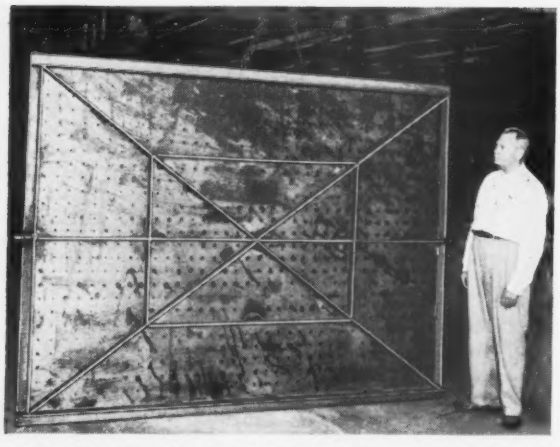
Circle 715 on Inquiry Card—Page 255

HERE'S "TOPS" in BOTTOM BOARDS



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Standard Core Plate and Bottom Board Styles are available in various sizes. Special designs, including round bottom boards, can be made to meet your needs.

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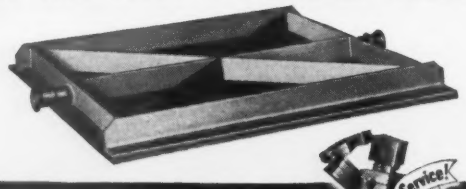

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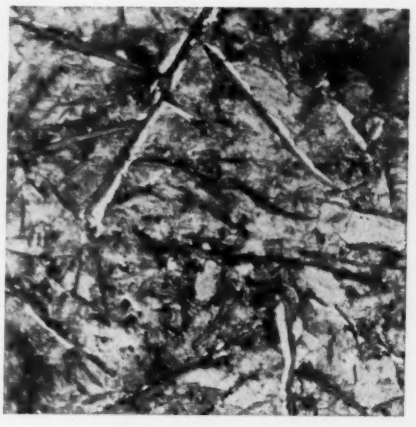
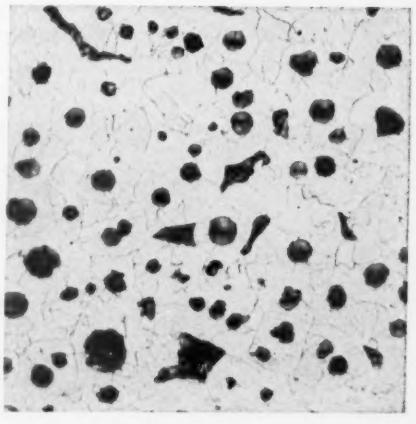
Chlorides Used in New Nodular Iron Process

Calcium Silicide Added As the Reducing Agent

A NEW process for production of nodular iron, developed by Allis-Chalmers Mfg. Co., Milwaukee, employs a mixture of sodium and magnesium chlorides with calcium silicide to obtain the desired structure. Those materials are added to low-sulphur iron melted in a basic cupola or produced by other means.





Above—Metal as tapped. *Below*—Metal from same heat after the addition of nodulizing agents. This is a basic cupola heat with pig iron. Magnification, X100

Details of the process were described by Dr. Harry K. Ihrig of Allis-Chalmers' research laboratories at the recent annual convention of the American Society for Metals.

Nodulization of the graphite is said to be accomplished by the elements sodium and magnesium, which are reduced from their chlorides by the calcium silicide in finely divided form and absorbed immediately in

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the molten iron. In experimental work halides of lithium, strontium, barium, rubidium and cerium have produced nodular graphite with calcium, potassium and barium as the reducing agents. However, low-cost sodium and magnesium chlorides with calcium silicide are the preferred agents.

Reaction Not Violent—The chlorides and silicide may be added in the spout or in the ladle, and the resulting iron is claimed to be easily machined in the as-cast state and to have a minimum elongation of 10 per cent in 2 in. No explosive reaction between the agents and molten metal is said to result even when a large ladle of iron is poured directly on a large amount of the addition agents.

In several month's operation in 1955 approximately 1400 tons of nodular iron castings weighing from a few pounds up to 5 tons were produced from iron melted in a 36-in. ID basic-lined cupola. In 1956 a 54-in. ID basic-lined cupola was placed in operation and some 5500 tons additional have been made. Largest casting weighed about 8 tons.

Two heats melted in the 36-in. basic-lined cupola are cited as indicative of results obtained with the process. One used charges composed of 350 lb pig iron, 300 lb nodular scrap, 350 lb steel scrap, and 8 silicon briquets. This metal was melted with 150 lb coke, 50 lb limestone, 20 lb fluorspar and 10 lb calcium carbide. Molten iron was treated with 0.4 per cent sodium chloride, 0.8 per cent magnesium chloride and 1.8 per cent calcium silicide. Additionally 8 lb per ton of ferrosilicon was added to the ladle.

The resulting nodular iron showed 79,500 psi tensile strength, 60,000 psi yield strength, 19.5 per cent elongation and 187 brinell hardness number. Composition was 3.34 per cent TC, 0.009 per cent S, 0.44 per cent Mn, 0.054 per cent P, 2.90 per cent Si, and 0.023 per cent Mg.

Another heat used charges of 1000 lb steel scrap and 20 silicon briquets which were melted with 175 lb coke, 45 lb limestone, 15 lb fluorspar, and 10 lb calcium carbide. Treated with 0.4 per cent sodium chloride, 0.8 per cent magnesium chloride and 1.8 per cent calcium silicide, and with the addition of 8 lb per ton of ferrosilicon in the ladle the following mechanical properties were obtained: 84,400 psi tensile strength; 64,000 psi yield point; 12.5 per cent elongation, and 197 brinell hardness number.

Composition of the treated iron was 3.39 TC, 0.009 per cent S, 0.58 per cent Mn, 0.050 per cent P, 2.97 per cent Si, and 0.026 per cent Mg.

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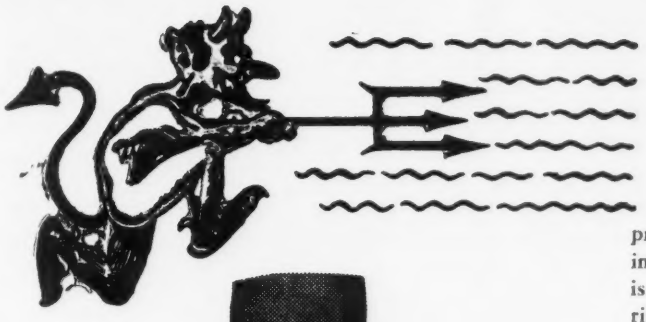
THERMOTOMIC® COMPOUND and CARBON FREE LIQUIDIZERS



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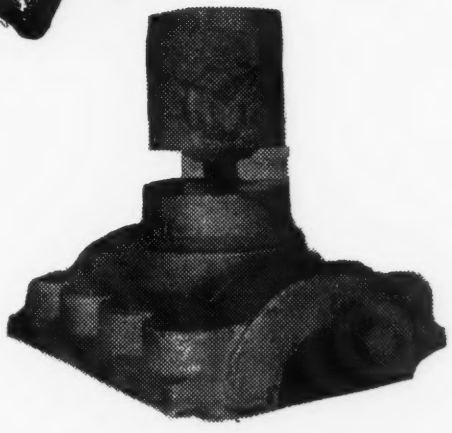
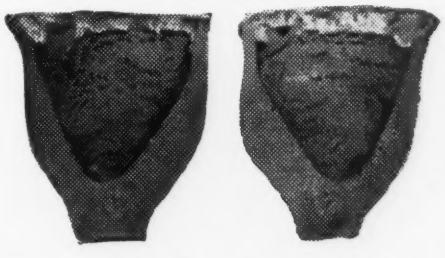
THERMOTOMIC "X" is a patented exothermic compound that produces a temperature over 3500° F. It can be molded or baked into any desired shape the same as sand cores. THERMOTOMIC "X" is used as knock off core rings with 1½ inch feeder opening under risers of feeding heads, also as insulating sleeves, inserts and facings, or mixed with facing sand where it is desired to maintain fluidity of the casting metal. Shorter and more compact heads and risers can be used. The small feeder opening permits easy removal of feeding heads and risers. In conjunction with THERMOTOMIC COMPOUNDS, we recommend the use of exothermic CARBON FREE LIQUIDIZER NO. 5 on top of the metal in the heads or risers as an insulating cover. For green sand casting molds, use THERMOTOMIC WP (Waterproof).

U. S. Patents No. 2,490,327 and No. 2,500,097



500 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.



NOTE THESE TYPICAL RESULTS FROM THE USE OF SOFFEL'S *Carbon Free* LIQUIDIZER

With the application of 1 pound of SOFFEL'S CARBON FREE LIQUIDIZER, this 6″ x 6″ chrome-nickel-steel riser was reduced in weight from 32 pounds to 13 pounds average. A savings of 19 pounds of salable metal, normally discarded as scrap, was fed into the casting and produced a heavier, sounder casting. Note the feeding head can be knocked off easily, saving burning costs. There is no better feeding head compound at any price than SOFFEL'S CARBON FREE LIQUIDIZER.

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No chills were used, no shrinkage at the flange. Note depth of shrinkage in the feeding head.

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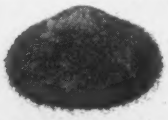
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Reduces Casting Costs by:

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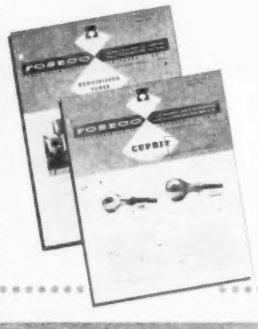
3. producing metal-free drosses
4. keeping crucible and furnace linings cleaner
5. reducing zinc fuming

And, it's safe, effective, scientifically sound and a simple, inexpensive operation.

We can't possibly tell you all the facts you should know about Foseco Cuprit here. So, we've prepared leaflets which give all the facts about treating copper and copper-zinc alloys.

Just circle the number listed below on the inquiry card in this issue and we'll send you copies free of charge.



THESE LEAFLETS:

1. explain the importance of melting conditions
2. explain the melting technique for copper-zinc alloys
3. describe Cuprit and tell which of the five grades should be used in your melting operation
4. give complete instructions for use in crucible, reverberatory and electric furnaces
5. explain the deoxidation process
6. list the advantages you can expect from these Foseco products

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Michigan Foundry Conference Program Is Announced

Annual Michigan Regional Foundry Conference will be held Nov. 29-30 at the University of Michigan, Ann Arbor. The university, Michigan State University and the four Michigan chapters of the American Foundrymen's Society are sponsoring the meeting.

Four technical sessions, two luncheon meetings and a banquet are included in the program. Details follow:

Thursday, Nov. 29

9 a.m.—Registration.

10 a.m.—Call to order. Robert D. Dodge, Archer-Daniels-Midland Co., Detroit, chairman.

10 a.m. to 12 noon—Technical session. Warner B. Bishop Jr., ADM, Cleveland, chairman. **"Development of the Shell Cast Armasteel Crankshaft,"** E. E. Braun, Central Foundry Division, GMC, Saginaw, Mich. **"Evaluation of Core Practice,"** Wayne Buell, Aristo Corp., Detroit. **"Diaphragm Molding,"** L. J. Pedicini, Process Development Section, Research Division, GMC, Detroit.

12:15 p.m.—Luncheon. **"Casting's Future in the Automobile of Tomorrow,"** M. F. Garwood, chief materials engineer, Engineering Division, Chrysler Corp., Detroit. Toastmaster Dean C. G. Brown, School of Engineering, University of Michigan.

2 to 4:30 p.m.—Technical session. Prof. C. C. Sigerfoos, Michigan State University, chairman. **"Basic-Lined Water-Cooled Cupola,"** William Dawson, Ford Motor Co., Dearborn, Mich. **"Malleable Base Spheroidal Iron,"** E. F. Chojnowski, Albion Malleable Iron Co., Albion, Mich. **"Modern Brass & Aluminum Foundry Practice,"** R. A. Colton, Federated Metals Division, American Smelting & Refining Co., Newark, N. J.

6:15 p.m.—Banquet. Speaker, C. L. "Biggie" Munn, athletic director, Michigan State. Toastmaster, William W. Maloney, American Foundrymen's Society.

Friday, Nov. 30

9 to 11 a.m.—Technical session. F. J. Walls, International Nickel Co., Detroit, chairman. **"The Foundry Outlook as Science Takes Over,"** Dean C. J. Freund, College of Engineering, University of Detroit. **"Manpower Maintenance,"** H. E. Gravlin Jr., Claude B. Schneible Co., Detroit.

11 a.m. to 12:30 p.m.—Technical session. R. F. Thomson, head, Metallurgical Research Staff, GMC, Detroit, chairman. **"Automotive Gas Turbine Development,"** D. F. Frey, associate director, scientific laboratory, Ford Motor Co., Dearborn, Mich.

1 p.m.—Luncheon. Toastmaster, R. B. Kropf, International Nickel Co., Detroit.

2 p.m.—Student activities. C. Drury, Central Foundry Division, GMC, Saginaw, Mich., chairman.

Schedule Industrial Research Conference for Chicago

Sales relationships, research efficiency and offshoot gains from research will be featured topics at the second National Industrial Research Conference to be held in Chicago next April 24-25. "Research for Profit" again will be the theme of the two-day conference, which will be sponsored by Armour Research Foundation of Illinois Institute of Technology at the Conrad Hilton Hotel.

Some of the nation's leading industrial executives will speak at the meeting. Nine papers will be presented, at three general sessions, on "Sales Growth through Research," "More Research for the Dollar" and "Extra Dividends from Research." There also will be addresses at two luncheons and a dinner meeting.

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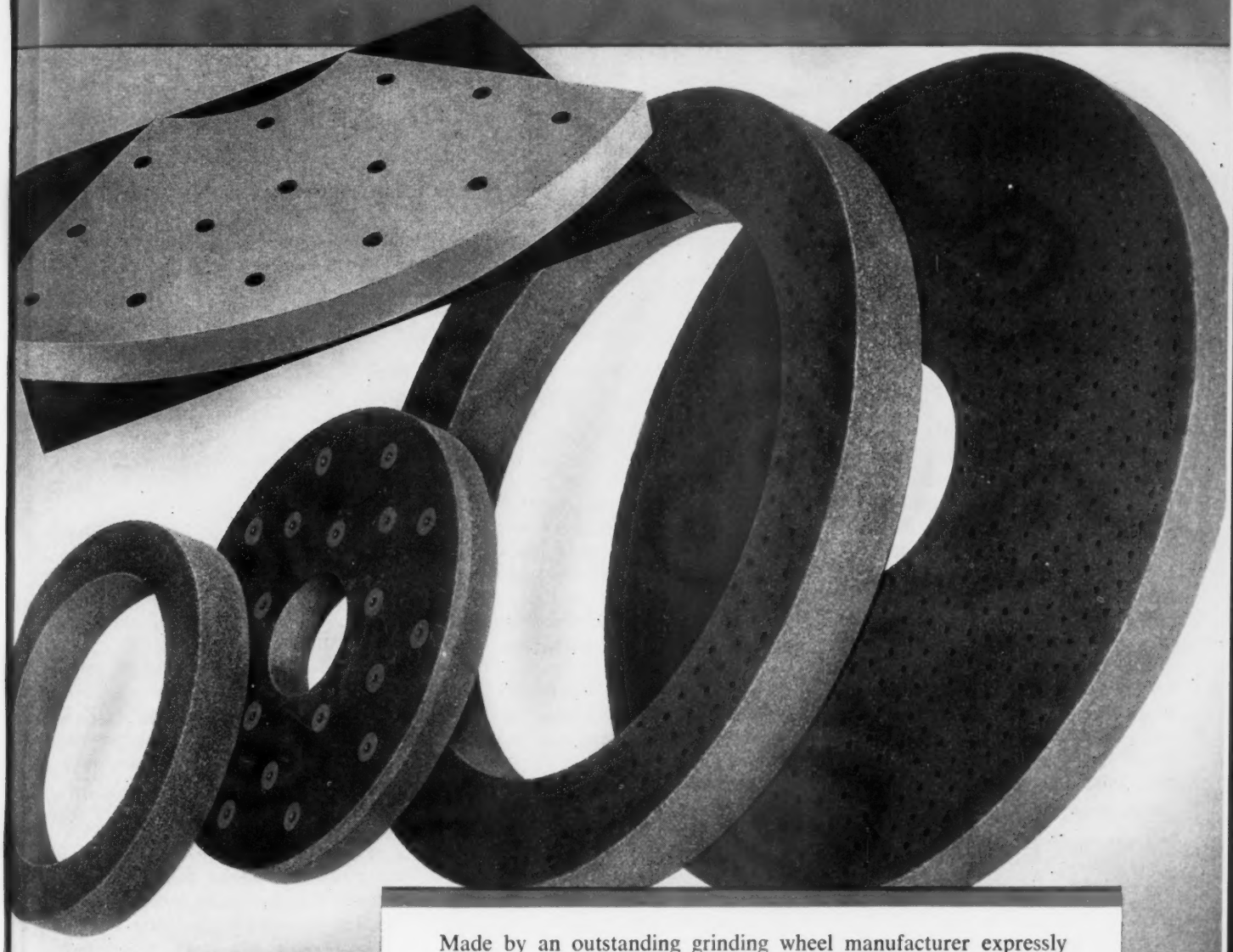

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Foundry Group Meetings

NORTHERN CALIFORNIA: Officers and directors of the Northern California chapter, AFS, met recently to plan for the new meeting season. At left, left to right, are Fred A. Mainzer, Pacific Brass Foundry Co., treasurer; Harold R. Hirsch, American Manganese Steel Division, American Brake Shoe Co., vice president; Harold E. Henderson, H. C. Macaulay Foundry Co., president, and Davis Taylor, Wheelabrator Corp., secretary. At right, left to right, front row, are Raymond Haun; Harold Lolley, Vulcan Foundry Co.; Hugh Prior, Superior Electrocast Foundry, and Clayton Russell, Phoenix Iron Works. Back row, left to right, are Edward Morgan; Dave Sutch, Brumley Donaldson Co. and Bill Burt. Photos by Albert "Kayo" Harris

St. Louis: "Cold Setting Binders" was the subject of Daniel R. Chester, manager, technical service, Archer-Daniels-Midland Co., as he spoke to 108 members and guests of the AFS chapter on Sept. 13. John O'Meara, Banner Iron Works, presided at the meeting. New officers, directors and committee chairmen were introduced. Technical chairman Everett E. Hart, East St. Louis Castings Co., introduced the speaker.

Mr. Chester explained and demonstrated the cold setting binder process. First introduced to this country from Europe in 1938, cold setting binders consist of a clay-free and thoroughly dry silica sand, a liquid binder and an activator which will release oxygen at room temperature. According to the speaker, the oxygen hardens the oil film on the sand grains, providing enough green strength so that the core is self-supporting until baking has completed the polymerization of the binder.

Advantages claimed for the process include ideal suitability for large cores because of the free-flowing nature of the green mix; reduced rodding as the core is partially hardened in the box; improved dimensional accuracy with no sagging; reduced oven baking time and temperature; improved shakeout.

Reported disadvantages of the process are that core sand must be absolutely dry; corebox is inactive while core is drying; bench life of mix is limited because of room temperature drying quality; cold setting action varies sharply with changes in room temperature, and the process is best suited for relatively large cores.—*Ralph Johnston, East St. Louis Castings Co.*

ST. LOUIS: At the September meeting of the AFS chapter, the gavel was turned over to the incoming chairman, John O'Meara, Banner Iron Works, by retiring chairman, George L. Mitsch, ACF Industries. Above, left to right, are Paul E. Retzlaff, Busch Sulzer Bros. Division, Nordberg Mfgl Co., chapter secretary; Mr. O'Meara; Mr. Mitsch; J. A. Cannon, Duncan Foundry & Machine Works, vice chairman; and R. C. Kane, Midvale Mining & Mfg. Co., treasurer

Central Ohio: Ralph L. Lee, retired, public relations department, General Motors Corp., spoke on "Foundry People as They Come and Go," before the AFS chapter at the Seneca Hotel, Columbus, O., on Sept. 10. Mr. Lee discussed at length four facts about people—every one is different; most people cannot change as much as they would like to; no one is the same all the time, and most people are proud.

The speaker emphasized that when things happen in the shop, there is always a reason why. "Remember the four facts about people, try to find out the reasons why things happen and then we might have a clue to help solve our shop problems," Mr. Lee said in closing.—*Jose Acebo, Ohio Malleable Division, Dayton Malleable Iron Co.*

Ontario: The first meeting of the chapter for the 1956-57 season was held Sept. 21, at the Royal Connaught Hotel, Hamilton, Ont., with an all-time record of 187 members and guests attending. F. W. Kellam, Electro Metallurgical Co. of Canada, chapter chairman, presided.

W. H. L. Bryce, International Harvester Co. of Canada Ltd., technical

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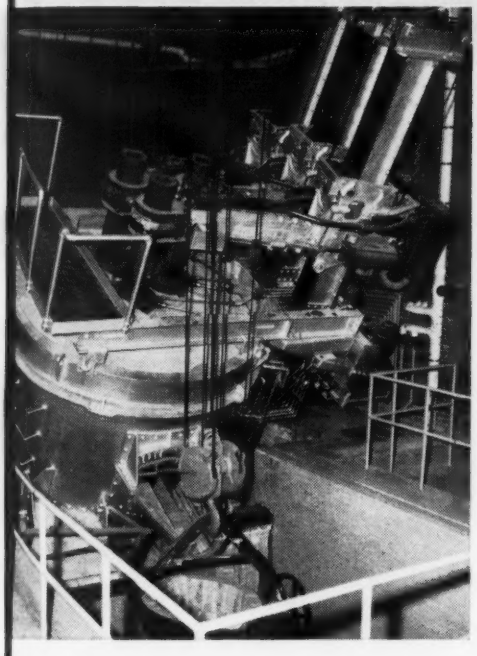

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- **SIMPLE, LOW COST FOUNDATIONS.** No cable tunnels or elaborate cable reeving—electrode hoist and roof cylinders are integral with furnace for proven maximum "on the line" performance.
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- **BALANCED MELT-DOWN ECONOMY.** Optimum melt-down speed is integrated with correct KVA rating and furnace diameter for each furnace size, providing maximum performance without penalty in refractory and maintenance costs.

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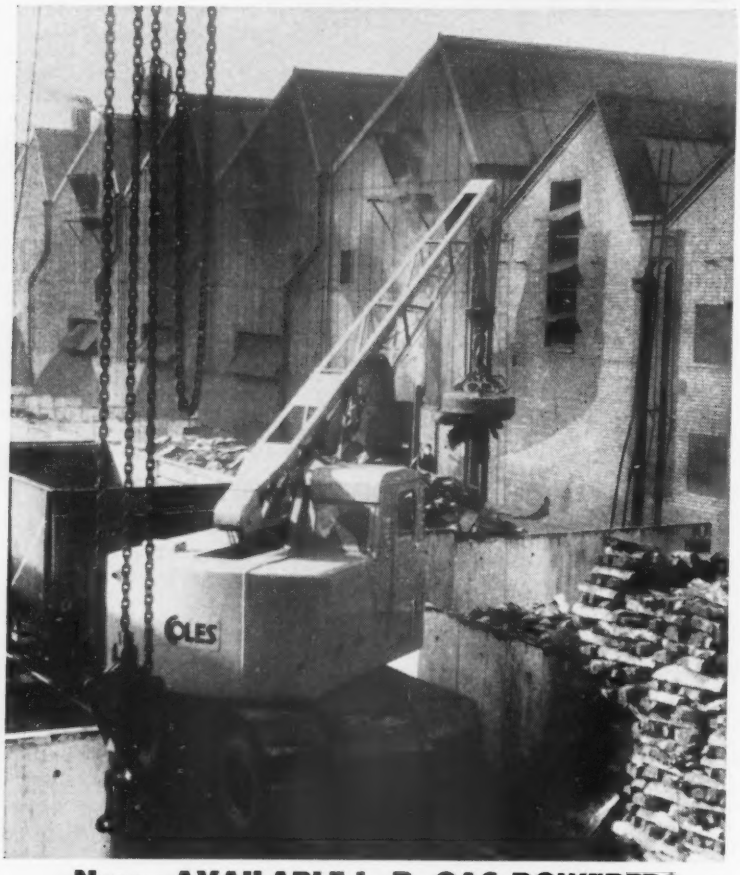

Now—AVAILABLE L. P. GAS-POWERED*

Foundry's *effective* mobile handling tool—COLES—is now available L.P. gas-electric powered for greater economy, flexibility and endurance. Self-propelled, truck or rail mounted, the COLES may be equipped with tongs, slings, clams or electro-magnets for an almost endless number of foundry materials handling operations. COLES CRANES *do* jobs better, faster, safer. *Also gasoline and diesel-electric powered.

- Shortest turning radius of any full circle slewing mobile crane
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ECONOMICAL FUEL CONSUMPTION: None other of equal capacity can claim the overall economy and foolproof operation of a COLES.

ECONOMICAL MAINTENANCE: Rugged construction, and the absence of complex gear boxes and wearing parts reduce servicing throughout COLES long-life service.

chairman, introduced C. A. Sanders, American Colloid Co., Chicago, who spoke on "Relative Merits of Sand Casting Techniques." The talk was based on Mr. Sander's paper, "Casting Finish — Tolerance — Precision," which he gave at the 1956 AFS Castings Congress in Atlantic City.

Main theme was that foundrymen can produce smoother, more accurate castings with conventional green sand molding methods if they will use existing methods, material and equipment to best advantage. Recently developed processes were discussed. Slides were shown illustrating that smooth finishes and close tolerances are possible in green sand casting by using finer sands and applying good foundry practice. The speaker emphasized that in many cases the extra effort and expenditure required to produce castings to close tolerances is not warranted when the end use of the castings is considered.—*L. H. Burbage, Otis Elevator Co. Ltd.*

Central New York: The AFS chapter met Sept. 14 at Trinkaus Manor, Oriskany, N. Y., to launch the new meeting season. About 100 members and guests attended to hear Stanley J. Butcher, safety consultant, U. S. Dept. of Labor, Washington, explain that the safety program designed for foundries, and recently instituted by the New York State Dept. of Labor, has had tremendous success in three other states, reducing the frequency by 18 to 41 per cent. Mr. Butcher's talk was highlighted by cartoons. — *William P. Ward, Oberdorfer Foundries Inc.*

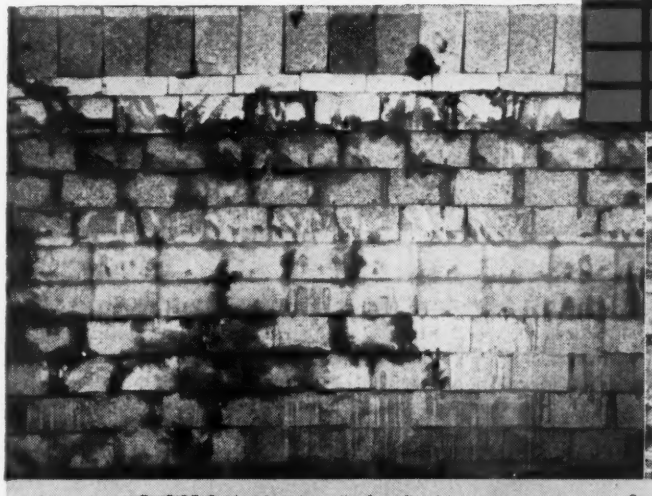
Wisconsin: Five sectional meetings and a sports movie were presented at the Sept. 14 meeting of the AFS chapter at Hotel Schroeder, Milwaukee. The Pattern Group heard Davis M. Shryer, Minnesota Mining & Mfg. Co. talk on "Plastic Dryers, Patterns and Coreboxes." Erwin Czerwinski, Nelson Pattern Co., acted as chairman.

The Gray Iron Group was addressed by L. L. Clark, Armour Research Foundation, Chicago. His subject was "Cupola Operation." Joseph J. Broecker, Lakeside Malleable Co., was chairman. The Malleable Group heard Z. Madacey, service manager, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, discuss "Coremaking and Coreblowing," with H. O. Page, Federal Malleable Co., serving as chairman.

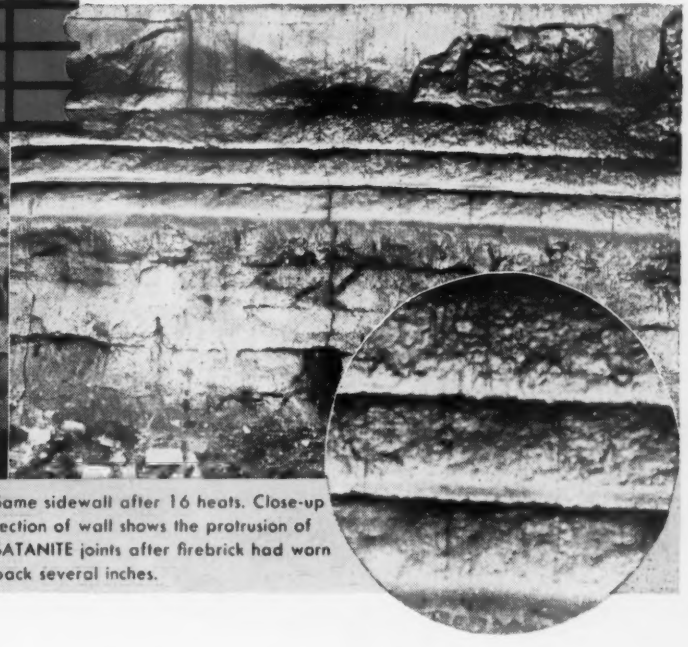
A. F. Pfeiffer, Allis-Chalmers Mfg. Co., talked to the Nonferrous Group

AFTER 16 HEATS SATANITE JOINTS PROTRUDE BEYOND THE FIRE BRICK SIDEWALLS

SATANITE JOINTS PROVIDE LONGER RUNS, INCREASED PRODUCTION, LOWER REFRACTORY COSTS



EMPIRE firebrick sidewall of malleable air furnace laid up with A. P. Green SATANITE. Note the thin brick-to-brick joints.



Same sidewall after 16 heats. Close-up section of wall shows the protrusion of SATANITE joints after firebrick had worn back several inches.

A large midwestern foundry reports excellent results from furnaces in which A. P. Green SATANITE slag resisting mortar was used in laying up the sidewalls. The above photographs clearly tell the story. A sidewall is shown immediately following installation and after 16 heats.

Note that after 16 heats, although the firebrick attacked by flame, slag and molten metal, has worn back several inches, the SATANITE joints still protrude ⅛ to ¼ inch beyond the surface. This enables the wall to wear back evenly and give added joint protection. Protection that pays off in lower refractory cost, longer runs and increased production.

In malleable air furnaces where sidewalls and bottom are laid up with SATANITE, any part of them can be easily removed for patching or rebuilding. Use SATANITE bonding mortar to increase the life of the lining in all types of malleable iron air furnaces, ladles, electric furnaces, cupolas, and hot metal mixers. Packed in 100-pound multi-wall bags.

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HOPPER BODY — At exceptionally low cost you can mechanize material-handling with this one basic unit and easily-changed attachments. For example — as a power wheelbarrow, Kwik-Mix S-10 Moto-Bug carries 1500 lbs. of bulk materials in 10 cu. ft., gravity-dump hopper. It climbs 16% ramps or grades fully loaded, turns in 61-inch radius, clears 33-inch aisles, doorways—works inside warehouses, box cars, elevators. (15 cu. ft. hopper body optional.)

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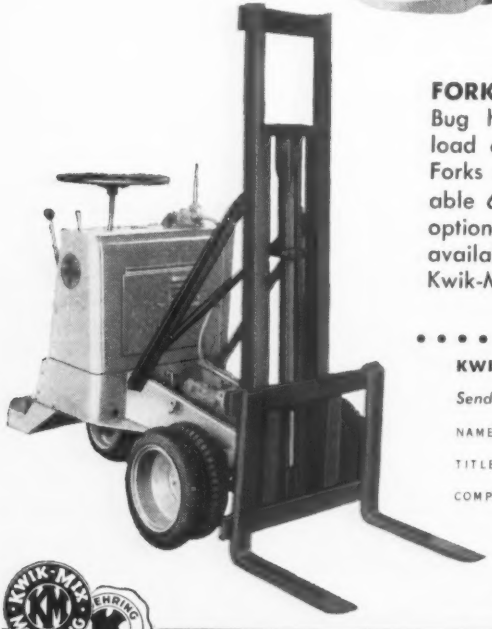

FORK LIFT attachment on S-10 Moto-Bug has 1000-lb. capacity (at 15-in. load center), and 6-foot lifting height. Forks are 20 or 30 inches long, adjustable 6 to 32 inches wide. Tilting mast optional. Big R-15 Moto-Bug also is available with special attachments. See Kwik-Mix distributor, or write us today.

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KWIK-MIX MOTO-BUG® (Koehring Subsidiary)

on "Co-ordinate Functions of Pattern Equipment and Castings." E. H. Jagmin Jr., Ampco Metal Co., was chairman for this section. Steel Group heard John A. Mueller, manager, grinding laboratory, Carborundum Co., Niagara Falls, N. Y., speak on "Save on Snagging." Donald Helman, Crucible Steel Casting Co., was chairman.

The color motion picture, "Sports Highlights of 1955," was shown through the courtesy of Miller Brewing Co.—*John E. Hubel.*

Chicago: The current meeting season was initiated Oct. 1 with a general meeting at the Chicago Bar Association attended by more than 200 members and guests. J. E. Stock, coreroom superintendent, John Deere Waterloo Tractor Works, Waterloo, Iowa, spoke on "Application of Shell Cores."

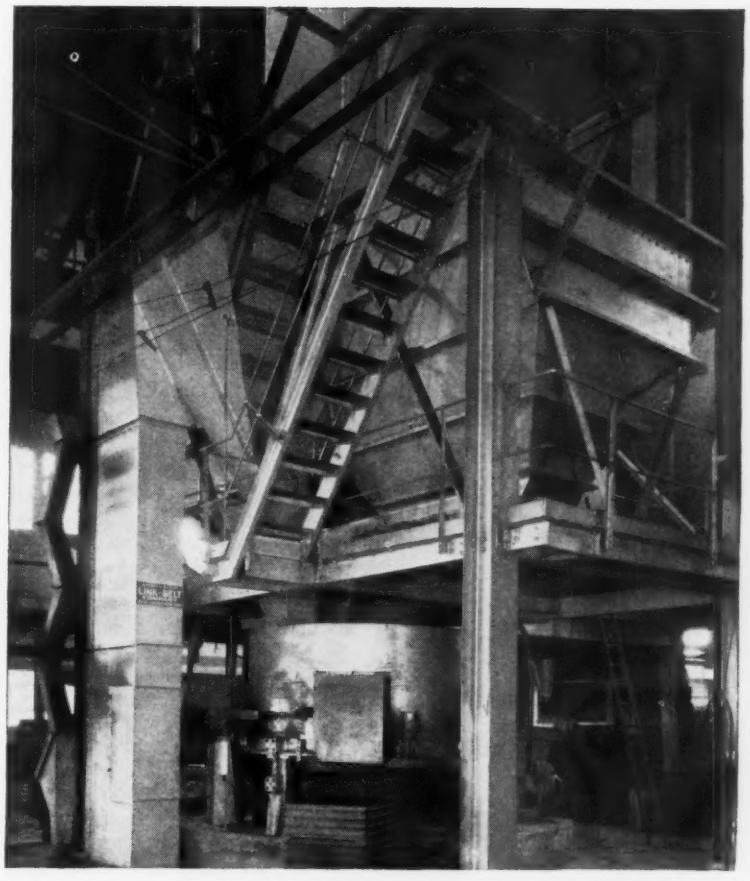
Chapter President Robert P. Schauss, Chicago manager, Werner G. Smith Inc., presided at the business meeting and announced that Earl J. Jacobson, chief chemist, Griffin Wheel Co., and A. E. Gatto, pattern engineer, Continental Foundry & Machine Division, Blaw-Knox Co., East Chicago, Ind., had been named directors of the chapter to succeed S. C. Massari and Harry C. Swanson, resigned.

Mr. Stock, introduced by chapter Vice President W. O. McFatridge, supervisor of foundry laboratory, Manufacturing Research, International Harvester Co., pointed out that there is a definite place for shell cores at his foundry, but he doesn't figure they will replace all cores. He prefers "hot box coremaking" as terminology, instead of "shell coremaking." The Deere Waterloo Foundry makes about 125 different cores of the new type.

Sand for the cores is hot coated in muller batches of 400 lb. Resin added ranges from 1.5 to 3.25 per cent. Coreboxes are cast iron, are vented at the parting lines and are heated by gas. Cores are blown, with some of the machines having up to six stations. Blowers with even more stations are planned. Core thicknesses range from ⅛-in. upward as strength is required. It was Mr. Stock's opinion that the hot box method of coremaking has potentialities for the small foundry as well as the large.

The Nov. 5 meeting will feature presentation of the Robert E. Kennedy Scholarship. Four roundtable sessions will be held as follows: Gray Iron and Malleable Divisions —

Circle 725 on Inquiry Card—Page 255



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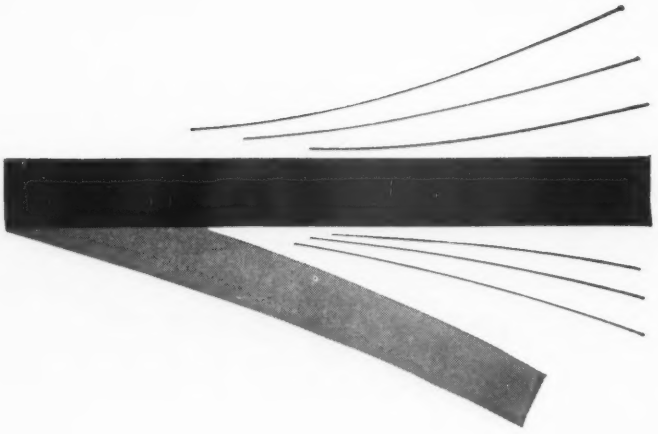

25,000 psi yield strength in aluminum castings without heat treatment

Federated's Tenzaloy, self-aging aluminum alloy, has an unusually desirable combination of properties, including exceptionally high yield strength, which is the best measure of ability to take punishment without failure.

Here are typical properties of Tenzaloy castings aged 10-14 days at room temperature:

Yield Strength, psi (.02% offset)	**25,000**
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Tenzaloy has other unique properties that help make it the most widely used of all high-strength, self-aging aluminum alloys; it takes a fine anodized finish, it has excellent machinability, it has superior corrosion resistance, and it can be brazed by standard techniques.

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"Water Cooled Cupola" by Harvey Henderson, research metallurgist, Lynchburg Foundry Co., Lynchburg, Va.; Steel Division—"Gases in Steel Castings," by H. H. Johnson, director of research, National Malleable & Steel Castings Co., Cleveland; Pattern and Nonferrous Divisions—"Plastic Patterns and Core Boxes," by P. von Colditz, assistant plant manager, Canadian Car & Foundry Co. Ltd., Montreal; and Maintenance and Engineering Divisions — "Will the New Chicago Zoning Laws Put You Out of Business?" by R. W. Jones, director, legislative department, Illinois Manufacturers Association.—*Erle F. Ross.*

Reading: The yearly roundtable discussion of the Reading Foundrymen's Association was held in the Berkshire Hotel, Reading, Pa., Sept. 18. Discussion leaders and their topics were: Raymond Foster, general foreman, Olney Foundry Division, Link-Belt Co., Philadelphia, gray iron; Roger Keeley, chief metallurgist, Ajax Metal Division, H. Kramer & Co., Philadelphia, brass-bronze, and James Blauch, vice president, Quaker Alloy Casting Co., Myerstown, Pa., steel.—*William I. Cassidy.*

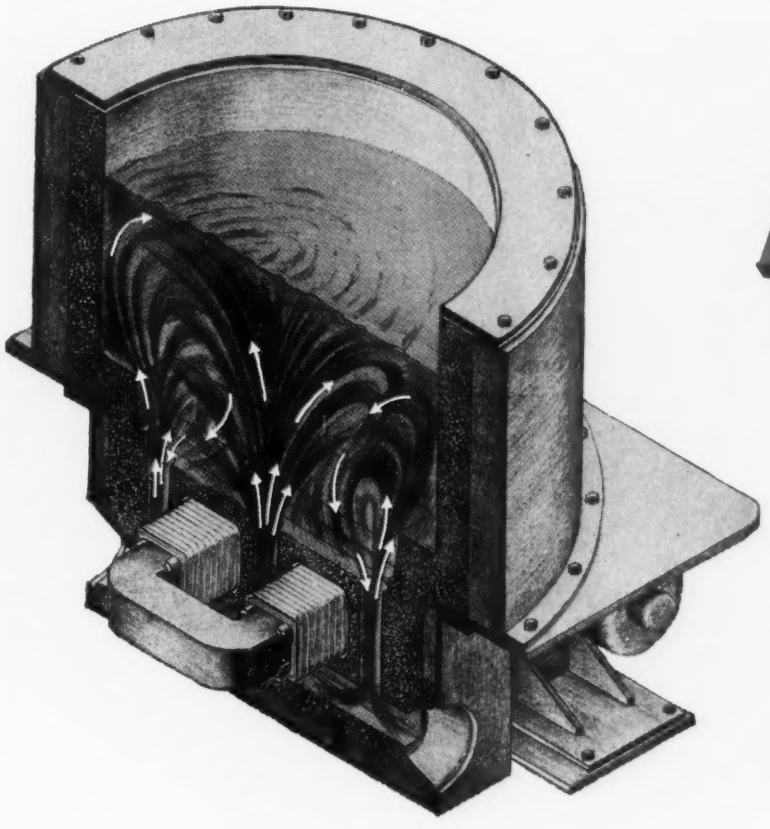
Connecticut Non-Ferrous: Shuttlemeadow Country Club, New Britain, Conn., was the site for the Sept. 19 meeting of the Connecticut Non-Ferrous Foundrymen's Association as it met to hear Joseph W. Tierney, manager, Houghton Laboratories Inc., Olean, N. Y., discuss "Plastic Tooling for Foundries."

The subject was introduced by citing the progress, development and advantages of the epoxy type plastics over the phenolics and polyesters.

Hysol epoxy plastic tooling is a duplicating process and adaptable to foundries for patterns and models of various descriptions. Once the mold has been completed, any number of patterns can be reproduced in a fraction of the time required for duplicate wood or metal patterns, according to the speaker. Smooth surfaces with excellent sand release are obtained. Material is stable and will not deteriorate but, after mixing, will cure at room temperatures. Some of the plastics (depending upon the formula) have strengths up to 50,000 psi ultimate tensile strength.

The talk was illustrated with slides showing numerous applications for the process. Techniques, meth-

The Furnace that Stirs Itself!



ELECTROMAGNETIC PRESSURE CIRCULATES MOLTEN METAL

—In this 60 Cycle—

AJAX TAMA-WYATT *Induction Furnace*

Heat is generated only in the melting channels. Controlled stirring (*neither too much nor too little*) guarantees uniformity of metal temperature and alloy composition and also leads to efficient melting of light scrap. Tiresome puddling is eliminated. The metal is held entirely in an inert refractory lining. The atmosphere is cool and free from contaminating gases.

No Other Method Enables such Completely

CONTROLLED MELTING

Today, AJAX builds a complete line of these time-tested furnaces in standard sizes up to 333 kW for the dependable melting of aluminum, brass, copper and zinc. Units for special applications are carefully engineered to specifications.

TWIN COIL INDUCTORS

Lead Non-Ferrous Melting

The sectional view above shows the twin coil stirring action of the 100 kW Ajax-Tama Wyatt 60 cycle induction furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electromagnetic circulation as shown by the arrows. The 100 kW furnace shown here, is one of a family of twin coil furnaces available today for melting rates from 300 to 10,000 lbs. per hour.

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AJAX TAMA-WYATT

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INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
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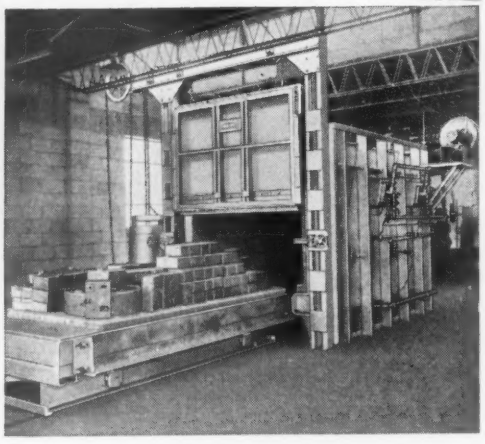
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

For Normalizing, Annealing and Stress Relieving

JOHNSTON CAR BOTTOM FURNACES



Engineering experience is apparent in the smooth operation of the Johnston Car Bottom Furnace. Roller bearings in car and door hoist shafts, mechanical car seals, and power operated car pullers are just a few of many practical features. Johnston "Reverse Blast" low pressure burners for oil or gas assure clean, economical, efficient heat for annealing, normalizing, and stress relieving.

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machined all over
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engineered to fit
the needs of
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ods, evaluations and precautions were pointed out for special and general applications.—*Frank B. Diana.*

Oregon: "We're turning a craft into an engineered metallurgical process, and we'd better pay more attention to the tools of quality control," said Frank S. Brewster, director of research and development, Brumley-Donaldson Co., Huntington Park, Calif., in a talk at the Sept. 19 meeting of the AFS chapter at Heathman Hotel, Portland, Oreg.

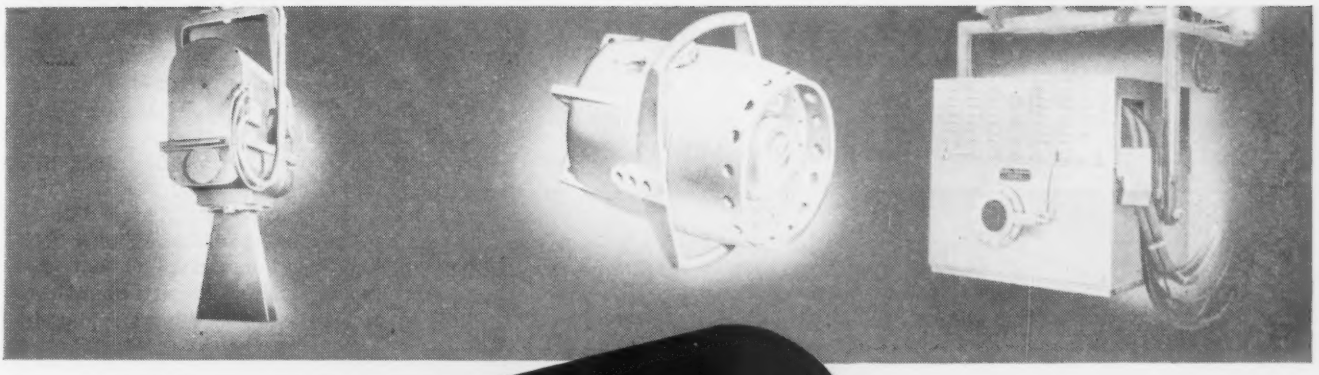
Mr. Brewster described the blow-squeeze shell mold process being used by Central Foundry Division, General Motors Corp., outlined the best practices for using quick setting binders and discussed the CO_2 process for all classes of castings in both ferrous and nonferrous metals.

The speaker emphasized that today foundries look to the engineer for guidance. Not enough West Coast foundries have a serious sand control program and do not use sand and scrap figures to find out where improvements can be made. Every sand variable can be expressed in weights, measurements, time and temperature. Molders and coremakers need to be supplied with uniform sand. Don't make tests just to "put them in the book."—*Bill Walkins, Electric Steel Castings Co.*

Southern California: First fall meeting of the AFS chapter was held Sept. 17 at Spenger's Restaurant, Berkeley, Calif., with 120 members and guests attending to hear Frank Brewster, Brumley-Donaldson Co., speak. Several new members were introduced.—*P. C. Valentine, Jr.*

Northeastern Ohio: L. P. Robinson, retired vice president, Archer-Daniels-Midland Co., and chief of its Foundry Products Division, Cleveland, was honored at the AFS chapter's initial meeting of the 1956-57 season, at Tudor Arms Hotel, Cleveland, on Sept. 13. Mr. Robinson was presented with a plaque for his 39 years of service to the industry and for more than 20 years of service to the chapter.

In the absence of Chairman Alex Barczak, Superior Foundry Inc., the meeting was presided over by Vice Chairman E. Claude Jeter, Cleveland Foundry, Ford Motor Co. Most of the past presidents of the chapter were present for the occasion. The plaque was presented by F. Ray Fleig, Smith Facing & Supply Co., past president and long-time treas-



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- Reduces exposure time—speeds up routine examinations.
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Here is a brand-new x-ray film that gives you greatly increased film speeds. It is a film that retains the fine sensitivity characteristics which have made Kodak Type A the most widely used x-ray film in industry. Then in addition it gives speeds up to more than double those of Type A.

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NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.

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New X-weld Chain— New Master Link

• The best has been made even better! ACCO *Registered* Sling Chains, recognized everywhere as the finest sling chains on the market, have now been made *still stronger and safer* by incorporating ACCO's great new Accoloy X-weld 125 chain and ACCO's new Shaped Section Master Link.

The Accoloy X-weld 125 chain is non-kinking. Each link has an oversize welded area with welds of full alloy strength. This means extra ruggedness and longer service life. The new Shaped Section Master Link weighs no more, but it withstands deformation under loads up to 18% greater than a conventional round section can.

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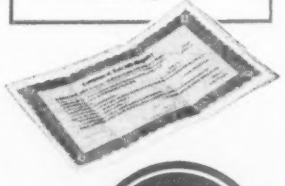

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urer of the chapter until two years ago.

Main treat of the evening was Mr. Robinson's delivery of his famous talk, "How to Lose Money on a Chicken Farm."

The chapter met on Oct. 11 to hear William A. Hambley, research consultant, Charles A. Krause Milling Co., Milwaukee, discuss "Casting Defects." Two hundred and twenty-five members and guests attended. Alexander D. Barczak, Superior Foundry Inc., chapter chairman, presided and E. Claude Jeter, first vice chairman and program chairman, introduced the speaker.

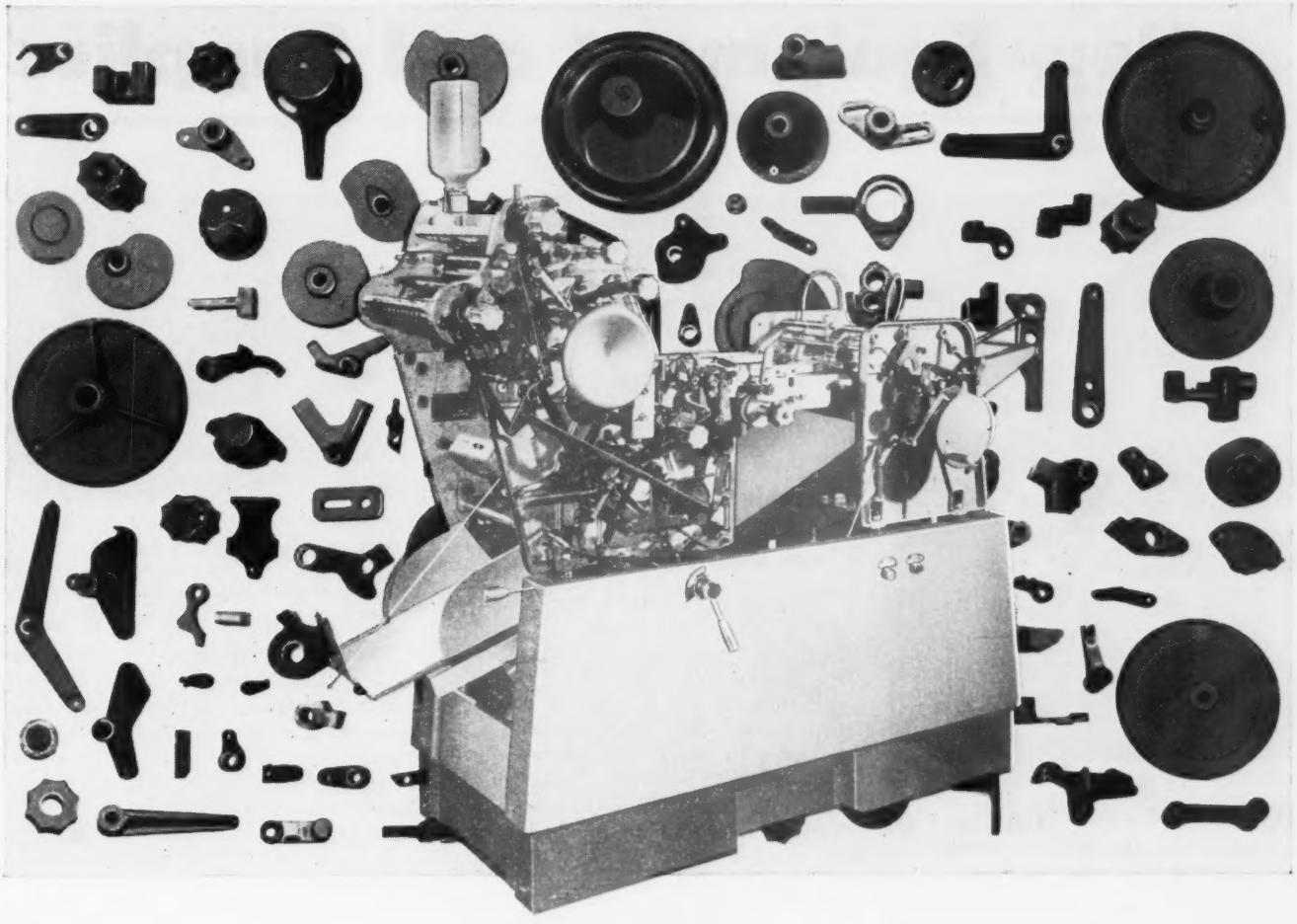
Mr. Hambley discussed the economics of the foundry scrap picture and pointed out that a 1 per cent scrap figure in the $6 billion foundry industry means an annual loss of $60 million—a loss that is never reclaimed. A 5 per cent scrap figure indicates a $300 million annual loss. With losses reaching such astronomical heights, the speaker said it was important enough a problem to merit serious study and attention.

He used a chart containing 30 common casting defects to emphasize that most of them are the responsibility of management and should never occur. He suggested that team work between management, supervisor and employees was needed to develop some sound, basic, unbiased facts about what is causing scrap and what is needed to get at the bottom of the costly problem. To this beginning, he would add a quality control program with its checks and balances—and the proper authority behind it—and guarantee that scrap losses will be reduced considerably. *—Jack C. Miske and Kenneth L. Mountain.*

Investment Casting Institute Approves Standard Test Bar

To assure uniformity of test results throughout industry, members of the Investment Casting Institute have approved a new cast-to-size tensile test bar for investment-cast materials. The new standard is a key part of the institute's program to establish standards for materials and test procedures.

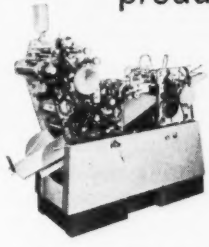
The new test specimen is ¼-in. in diam. It was selected from seven or more test bars known to be in use by the industry in connection with the testing of investment-cast materials. The ¼-in. bar was felt by the institute to be the most representative and popular size for general use. Use of the standard test bar will minimize variables otherwise encountered and may permit cost savings if a standard pattern is used.



This machine features

OVER 125 SHELL-MOLDED PARTS

produced exclusively with G-E SHELL-MOLDING RESINS



Whitin's *Masterlith* Duplicator* contains over 125 shell-molded parts! And here are the advantages that Whitin gets from selecting shell molding over other foundry techniques:

1. **Smoother finish** that drastically reduces machining, minimizes the need for expensive machining equipment.
2. **Closer tolerances** that enhance *Masterlith* Duplicator performance.
3. **Sounder internal structure** that cuts reject losses.
4. **Precise dimensional reproduction** of intricate shapes.

Whitin uses General Electric shell-molding resins *exclusively* in producing parts for the *Masterlith* Duplicator, relying on them for batch-to-batch uniformity and correctly balanced properties.

*Mfd. by Whitin Business Equipment Corporation, Whitinsville, Mass.

How can shell molding help YOU?

General Electric maintains a shell-molding laboratory in Pittsfield, Mass., to help foundrymen and casting buyers solve problems and evaluate the process. Ask us about it, or write today for a free copy of the *G-E Shell-Molding Manual* which describes and illustrates the techniques and benefits of this new casting method. *CHEMICAL AND METALLURGICAL DIVISION, General Electric Company, Section 6F5A1, Pittsfield, Massachusetts.*

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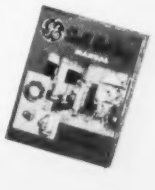


New Equipment and Supplies

Surface Finish Tester

scans surfaces and computes all standard finish designations

William J. Hacker & Co., 82 Beaver St., New York, N. Y.—Surface finishing and measuring instrument scans surfaces and computes electronically, either in microns or microinches, all standard surface finish designations. An absolute measurement is obtained, not comparison between a surface standard and the surface being tested. The unit measures plane or curved surfaces, internal and external diameters and tapers and arbor holes from ½-in. diam and upwards. The tester consists of a measuring head containing an electrical feeler system, feed mechanism and the components for conversion of electronic values into surface index standards.

For More Details Circle No. 401—Page 255

Portable Vacuum Pump

is for pilot plant and small-scale production applications

Kinney Mfg. Div., New York Air Brake Co., Boston, Mass.—Portable high-vacuum pumping system is intended for pilot and small-scale production operations. Designed to attain absolute pressures as low as 10^{-6} mm Hg, the new mobile system employs a fractionating 4-in. diffusion pump, connected to a 15-cfm, two stage roughing and backing mechanical vacuum pump. All components including the electrical control panel are mounted compactly on a base fitted with two fixed and two swivel wheels, caster lock and pull handle. Required service connections are a single-phase, 60c 110-115 v ac outlet and a source of cooling water. The unit is recommended for use in exhausting 10 to 15-cu ft chambers for vacuum impregnation, degassing, stress relieving and similar operations.

For More Details Circle No. 402—Page 255

Portable Pyrometer

checks and calibrates laboratory temperature instruments

Technique Associates Inc., 211 East South St., Indianapolis 25, Ind.—Portable potentiometric pyrometer is for checking and calibrating all types of industrial and laboratory temperature instruments. The pyrometer may be used to check and calibrate any temperature recorder, indicator or controller operating within a range of 32 to 3215°F and employing any type of thermocouple. It also measures

the direct current potentials of electrical equipment within a range of 0 to 155 millivolts. Accuracy is said to be 1/6 of 1 per cent of scale spans. Total weight is 14 lb. Over-all dimensions are 8½ x 9 x 12¼ in.

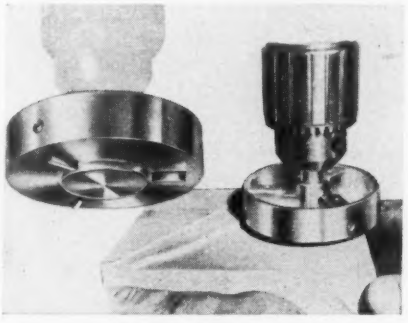
For More Details Circle No. 403—Page 255

Crucible Pouring Lip

for tilting furnaces assures fast, uniform metal flow

Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2, N. Y.—Simply-installed pouring lip said to assure fast, uniform metal flow is being shipped with each crucible for tilting furnaces. The lip is suitable for both aluminum and brass and fits into a grooved slot which provides an interlocking feature.

For More Details Circle No. 404—Page 255



Rotary Planer

has closed bottom and propels chips away from the operator

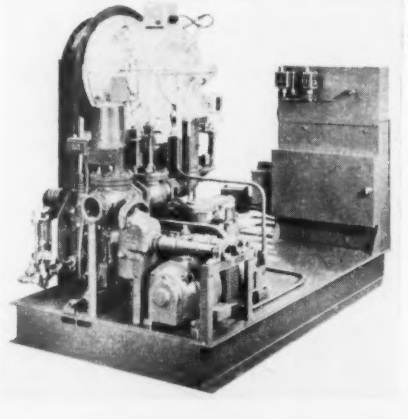
Lloyd's Craftlines, 921-F East Cedar Ave., Burbank, Calif.—Patternmaker's rotary planer has closed bottom and blade arrangements that propels wood chips away from the operator's face. Drill press attachment has 3-in.-diam machined alloy body with a ½-in.-diam cast-in steel shaft. Each of three tool steel blades is sharpened on the bottom and outside edges and cuts a full ⅛ in. deep by 2½ in. wide per pass.

For More Details Circle No. 405—Page 255

Combustion Assemblies

can be used on ovens, dryers, furnaces or heat exchangers

Orr & Sembower Inc., Reading, Pa. —Packaged combustion assemblies include burner, automatic controls, forced-draft air supply, full modulation firing control, ignition, complete piping and wiring and the refractory required for the burner throat. Flexibility permits use on furnaces, ovens, vats, kilns, dryers, boilers or heat exchangers. The assemblies use gas, oil or combination gas-oil firing for modernizing or converting existing equipment or for obtaining efficient



For More Details on These Items
Use Reply Card—Page 255

operation from new installations. Burner comes as a complete unit. Five sizes are available for maximum firing rates ranging from 3 to 25-million Btu per hr.

For More Details Circle No. 406—Page 255

Sand Coating Mullers

coat or blend sand with either dry or liquid resin

Shalco Engineering Corp., 81 Encina Ave., Palo Alto, Calif.—Sand coating mullers of 125, 300 and 1000-lb capacities are for rapid coating or blending of sand with either dry or liquid resin for use in shell molding or shell coreblowing. After

coating, materials are dried under compressed air introduced through a blower. Sand is discharged from a bottom discharge door and is ready for immediate use or storage. Machine also is suited for mixing of oil sands or green sand facings.

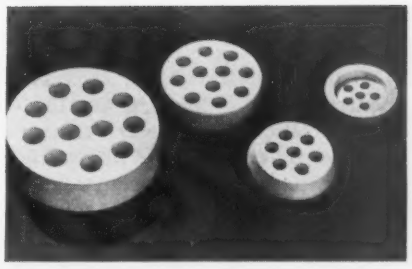
For More Details Circle No. 407—Page 255

Rare Earth Compounds

imported from England are for use in metallurgical research

Jarrell-Ash Co., 26 Farwell St., Newtonville 60, Mass.—High purity rare earth oxides and compounds are imported from England and are available in various grades and chemical forms ranging from spectrographically certified highest available purity —as high as 99.998 per cent—down to lower grades. An assortment of rare earth salts also is available.

For More Details Circle No. 408—Page 255



Strainer Cores

can withstand 3000° F temperatures without disintegrating

Star Porcelain Co., 43 Muirhead Ave., Trenton 9, N. J.—Strainrite refractory strainer cores, made by a special formula, are said to withstand 3000°F temperatures without spalling or disintegrating. Cores are made in various sizes up to 4¼ in. in diam, or by special order, in sizes to meet specifications. Cores are designed to keep slag and sand core inclusions out of castings.

For More Details Circle No. 409—Page 255

Release Agent

aids parting of epoxy castings from molds or master patterns

Smooth-On Mfg. Co., 572 Communipaw Ave., Jersey City 4, N. J.—Release agent leaves an imperceptible film after application for parting of epoxy resin castings from plaster molds or from metal, wood or epoxy masters. Agent also is said to be effective in parting plaster from plaster or gypsum cements. Material can be applied by rubbing, brushing or spraying.

For More Details Circle No. 410—Page 255

Sand Mix Additive

combines the effectiveness of wood flour and seacoal

Frederic B. Stevens Inc., 1800 Eighteenth St., Detroit 16, Mich.—Carbonized cellulose additive is said to combine the effectiveness of wood flour and seacoal in one product to eliminate the need for purchasing and storing two materials. Manufacturer reports that for many foundry jobs an addition of less than 3 per cent of the material will replace 6 to 7½ per cent seacoal, with no other additive needed.

For More Details Circle No. 411—Page 255

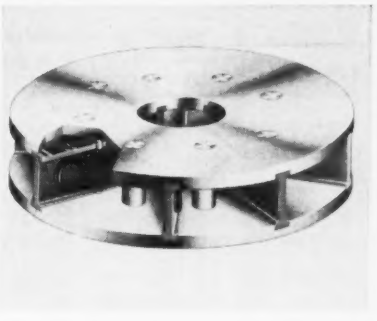
Air Setting Cement

is highly refractory with a melting point of about 2750°F

Norton Co., Worcester 6, Mass.—Crystolon RC 2351 air setting cement is designed for use in incinerators,

Wheel Is for Use in Airless Blast Cleaning

NEW TYPE of abrasive throwing wheel is for centrifugally propelling abrasive in airless blast cleaning units. Known as the GM unit, it is made for use on airless abrasive blast cleaning equipment already installed in plants, as well as on machines being manufactured. It is available currently in the 2½-in. wide x 19½ in. diam size.



The wheel reportedly reduces maintenance costs that result from wear. This is accomplished by a spring arrangement for holding the wheel blades in the wheel. This locking arrangement is not in the abrasive blast stream nor subject to any appreciable wear. It can be inserted or removed without special tools. Blades are made of heat-treated alloy steel said to have given twice the operating life of conventional blade material.

Reported advantages are said to be elimination of the binding of set screw threads that occurs from abrasive and dust, elimination of blade breakage caused by pressure of set screw against the blade, and more uniform wheel wear through two-point holding of the wheel blades. Made by Wheelabrator Corp., 505 South Byrkit St., Mishawaka, Ind.

For More Details Circle No. 456—Page 255

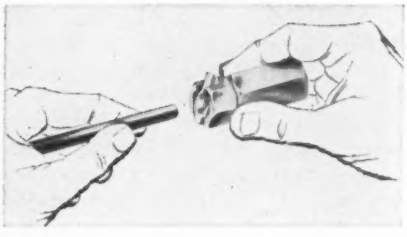
boilers, gas generators or other high temperature applications where minimum slag build-up is essential. Material is a fine-grained silicon carbide cement, sized 30 mesh and finer, with the addition of an air-setting constituent. It is highly refractory, having a melting point of about 2750° F. The cement can be troweled or sprayed on surfaces to be treated.

For More Details Circle No. 412—Page 255

Tube Plug and Connector

provides method of attaching pressure lines to tubing

Mechanical Products Corp., 168 North Ogden Ave., Chicago, Ill.—Self-sealing, automatic-locking, "push on-



pull off" tube plug and connector provides a fast, safe and efficient method of attaching pressure and vacuum lines to straight end tubing. The unit permits connection without use of tools, threading, soldering or brazing. The connector is designed to operate at any pressure to 1000 psi and any vacuum to 25 microns. Said to be equally efficient for air, water, steam, oil, freon 12 or 22, and suitable for temperatures from −40°F to +275°F, the connector is available in three standard sizes for ¼, 5/16 and ⅜-in. OD tubing.

For More Details Circle No. 413—Page 255

Temperature Controls

are for a wide variety of specialized control applications

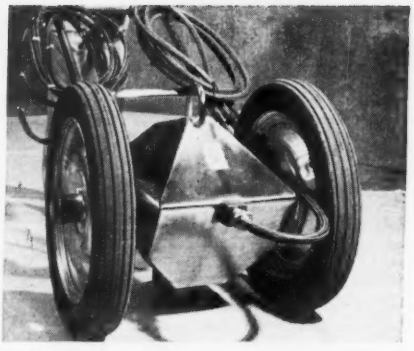
West Instrument Corp., 4361 West Montrose Ave., Chicago 41, Ill. — Three-position pyrometer temperature controllers are for a wide variety of specialized control applications, including industrial ovens and furnaces. Units are said to be wired easily for heating with automatic cooling, motor operated fuel valves, hi-lo-off or hi-lo-med electric or fuel systems, control with high limit feature and automatic reset. The controls provide for two types of neutral band, each with two types of control. One, with a single setting pointer, permits no more than 1 per cent of scale range as neutral. The other, with two settings, permits spread up to 20 per cent of range.

For More Details Circle No. 414—Page 255

Isotope Radiography

unit is portable for field work and needs no power supply

Budd Co., 2450 Hunting Park Ave., Philadelphia 32, Pa.—Isotope radiographic machine for portable field work uses the radiation from a 50-curie cobalt-60 source to detect flaws in castings, welded joints or any structure where strength is critical.



The machine reportedly can accomplish the same job as a 2-million-volt x-ray machine. Unit is self-contained, requires no power supply and can be wheeled readily by one man to any in-plant location or taken out for field work. Remote control operation allows the source to be exposed up to 50 ft from the operator with complete safety.

For More Details Circle No. 415—Page 255

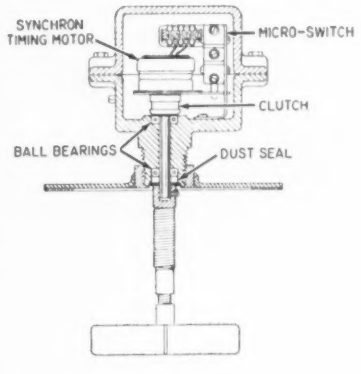
Bronze Welding Rods

are coated for use on dirty, oily or greasy surfaces

Air Reduction Sales Co., Division of Air Reduction Co., 150 East 42nd St., New York 17, N. Y.—Extruded, heavy-coated bronze oxyacetylene welding rods are designed for brazing and welding malleable iron, cast iron, brass and bronze with dirty, oily or greasy surfaces. Four diameters—⅛, 3/16, ¼ and 3/32-in.—are available. A dipped coating rod for clean production work also can be supplied.

For More Details Circle No. 416—Page 255

Unit Controls Bin Level of Flowable Material



ROTATING paddle-type bin level indicator is designed for use in hazardous atmospheres Class I, Groups C and D and Class II, Groups E, F, and G. Included in these groups are vapors of ethyl ether, gasoline, petroleum, alcohol, acetone, lacquer solvent, natural gas and atmospheres charged with grain dust, carbon black, coal or coke dust, and atmospheres containing metal dust, including aluminum, magnesium and their commercial alloys.

The Roto-Bin-Dicator is designed to indicate or control the level of any bulk material that will flow—from light aerated powders to heavy abrasive or lumpy materials. It reportedly is particularly suited for application on bins under pressure or vacuum. A low torque motor rotates the paddle at slow speed. Material building up to the indicator stops the rotating paddle and stalls the motor. As the motor stalls, the torque of the motor actuates a microswitch to control signal lights, horns or motors of conveyors or feeding machinery. The unit is manufactured by Bin-Dicator Co., 13946-107 Kercheval, Detroit 15, Mich.

For More Details Circle No. 457—Page 255

Order Point Calculator

is said to improve inventory control at lower cost

Van D. Mark, Box 67, Mount Clemens, Mich.—Order point calculator is designed to improve managerial con-

trol over placement of purchasing and manufacturing orders. Using an accredited formula, the calculator establishes exact order points for any stock item and indicates for each item the minimum stock level at

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481. Cupola Operation

Whiting Corp., 157th St. and Lathrop Ave., Harvey, Ill.—Bulletin FO-11, "Fundamentals of Cupola Operation," discusses factors of cupola operation that affect combustion and melting conditions. Emphasis is placed on the importance of coke quality, material size, stock distribution and "hang-ups." Accessory equipment is described.

482. Thermocouples

L. H. Marshall Co., 270 West Lane Ave., Columbus 14, O.—Company's stationary and portable enclosed tip foundry thermocouples are illustrated and described in catalog. Replacement units and spare parts also are listed with complete price information.

483. Foundry Alloys

Whitehead Metal Products Co., 303 West 10th St., New York 14, N. Y.—Booklet, "Foundry Alloys," discusses ductile iron additives, ferroalloys, molybdenum alloys, monel and nickel. Sizes and analyses of available ingot, shot, squares and briquets are provided as well as mesh sizes in lumps, granules, screenings and powders. A data section contains a hardness conversion table and glossary.

484. Gating Bronze Castings

R. Lavin & Sons Inc., 3426 South Kedzie Ave., Chicago 23, Ill.—Vol. 12, No. 3, of *The Lavingot News and Views* presents an article entitled, "Bronze Pressure Castings and Directional Solidification," by Alfred H. Hesse. The article briefs the results of an investigation on a special ring type gating system.

485. Core and Mold Wash

Fire Brick Engineers Co., 2400 South 43rd St., Milwaukee 1, Wis.—Zircon core and mold wash that provides a highly refractory (about 3700°F) surface coating is described in bulletin. Marketed as Meritex #300, the wash also has application as a ladle wash or coating on cupola spouts, tap-outs and ladle lips.

486. Dust Control

Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Md.—Form 2268 lists three bulletins, Nos. 915, 919 and "Out of the Realm of Dust," providing information that should be considered if dust problems are present.

487. Air Cylinders

Petch Mfg. Co., 463 York St., Detroit, Mich.—Revised bulletin includes engineering data, specifications, features and performance information on 16 air and low pressure hydraulic and 15 high pressure hydraulic cylinders.

488. Sand Preparation

Beardsley & Piper Division, Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39, Ill.—Bulletin 1315A provides specifications and general performance data on three

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401	426	451	476	501	526	551	576	601	626	651	676	701	726
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416	441	466	491	516	541	566	591	616	641	666	691	716	741
417	442	467	492	517	542	567	592	617	642	667	692	717	742
418	443	468	493	518	543	568	593	618	643	668	693	718	743
419	444	469	494	519	544	569	594	619	644	669	694	719	744
420	445	470	495	520	545	570	595	620	645	670	695	720	745
421	446	471	496	521	546	571	596	621	646	671	696	721	746
422	447	472	497	522	547	572	597	622	647	672	697	722	747
423	448	473	498	523	548	573	598	623	648	673	698	723	748
424	449	474	499	524	549	574	599	624	649	674	699	724	749
425	450	475	500	525	550	575	600	625	650	675	700	725	750

751	761	771	781	791	801	811	821	831	841	851	861
752	762	772	782	792	802	812	822	832	842	852	862
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754	764	774	784	794	804	814	824	834	844	854	864
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756	766	776	786	796	806	816	826	836	846	856	866
757	767	777	787	797	807	817	827	837	847	857	867
758	768	778	788	798	808	818	828	838	848	858	868
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760	770	780	790	800	810	820	830	840	850	860	870

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rubber - tired, portable units for screening, aerating and discharging foundry sand. Capacities are 750, 1000 and 1500 lb per minute.

489. Cast Iron Alloy

Electro Metallurgical Co., Division of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, N. Y.—Booklet, "SMZ Alloy—An Inoculant for Cast Iron," discusses the metallurgical aspects of inoculation and illustrates how to inoculate irons with SMZ alloy to reduce chill depth and improve machinability, tensile strength and transverse properties. SMZ alloy is a balanced graphitizing inoculant containing silicon, manganese and zirconium.

490. Surface Conditioner

Para Products Division, Foundry Rubber Inc., 5200 River Rd., Washington 16, D. C.—Technical data sheet details properties, applications, advantages and recommendations for use of Paraspray, a fast drying, liquid chemical surface conditioner that may be applied to either green or baked sand cores and molds to provide mold atmosphere control.

491. Safety Air Gun

Union Engineering Corp., South Hadley Falls, Mass.—Pistol grip type air gun that diverts an air stream through fluted passages to prevent chip "flyback" is described in information sheet.

492. Abrasive Belt Unit

Grinding & Polishing Machinery Corp., 2530 Winthrop Ave., Indianapolis 5, Ind.—Specifications and in-use application photographs of portable abrasive belt unit for light grinding, polishing, deburring or cleanup operations are found in bulletin 109.

493. Time Controls

Paragon Electric Co., Two Rivers, Wis.—Booklet on multipurpose and industrial time controls provides answers for countless electrically operated automatic on-off operations used in commercial and industrial applications. A fold-out chart defines what each control is, what it does, where it may be used and how to select and purchase it.

494. Cloth Dust Collectors

Wheelabrator Corp., 1102 South Byrkit St., Mishawaka, Ind.—Bulletin 557-D treats the subject of super cleaning ordinary atmospheric air by specially adapted industrial cloth-filter-type dust collectors. The Ultra-filtration process has a variety of applications, including several of interest to foundrymen.

495. Hook Scale

Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif.—Bulletin M-25 contains in-use photographs of the SU-20 Sensater hook scale in weighing operations in several industries. Scale capacities range up to 20,000 lb.

496. Flammable Liquids

Protectoseal Co., 1920 South Western Ave., Chicago 8, Ill.—A practical, nontechnical, illustrated explanation of the nature and safe plant use of flammable liquids is contained in a series of articles, "Flammable Liquids—their characteristics, hazards and safe handling," available in a loose leaf binder cover.

497. Speed Reducers

Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.—Booklet B-6727 is an engineering manual presenting complete speed reducer application information such as horsepower ratings, torque capacity, overhung load values, dimensions, construction features, installation and maintenance for single, double and triple reduction. The reducers may be driven by electric motors, gas, oil or diesel engines.

498. Melting Furnaces

Furnace Exchange, Denton Corner, Seaford Rd., Newhaven, Sussex, Eng.—Bulletin illustrates and describes a range of noncrucible oil or gas fired melting and holding furnaces suitable for gun metal, bronzes and aluminum alloys. Furnaces are said to combine the advantages of semirotary, rotary and reverberatory units in one furnace.

499. Penetrant Inspection

Turco Products Inc., 6135 South Central Ave., Los Angeles 1, Calif.—Folder, "How to Perform Dye Penetrant Inspections," discusses the aspects of penetrant flaw inspection—precleaning, applying penetrant, removing excess penetrant, applying developer and interpreting results.

500. Oxygen Cylinder

Linde Air Products Co., Division of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, N. Y.—Folder illustrates and highlights the advantages of a liquid oxygen cylinder that contains 3000 cu ft of oxygen to assure continuous supply without interruptions for change-

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overs. Cylinders are said to hold more than 12 times as much oxygen as conventional cylinders.

501. Barrel Finishing

Norton Co., Worcester 6, Mass.—Booklet, "Barrel Finishing with Norton Tumblex Abrasives," introduces the subject of barrel finishing, what it is and what parts and materials are used and what action takes place. Abrasives, abrasive media, barrel equipment, cleaning compounds, practical hints to operators and a glossary of terms also are included.

502. Walkie Trucks

Moto-Truc Co., 1959 East 59th St., Cleveland 3, O.—Catalog describes complete line of electric powered walkie trucks. Data on pallet trucks, low lift platform trucks, tractors, outrigger models and counterbalanced models are included.

503. Steel Pallet Boxes

Hamlin Metal Products Co., 2741 Wingate Ave., Akron 19, O.—Construction features, specifications and in-use applications of pallet-type steel material handling boxes are highlighted in catalog 1275-A.

504. Analytical Balance

Arthur S. LaPine & Co., 6001 South Knox Ave., Chicago 29, Ill.—Data sheet describes an analytical balance said to be accurate to 1/100,000 of capacity, sufficient for most laboratory determinations.

505. Chain Slings

Republic Steel Corp., Advertising Division, 3100 East 45th St., Cleveland 27, O.—Catalog on chain slings, chain sling fittings and accessories is illustrated with drawings and diagrams to explain the terminology of chain slings and to assist buyers and users in specifying exactly what they require for maximum safety, service and economy.

506. Dust Separator

Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.—Specifications and general information on dust separator that collects all kinds of buffing lint, dust, chips and shavings in 55 gallon drums are found in information sheet.

507. X-Ray Diffraction

General Electric Co., X-Ray Dept., Milwaukee 1, Wis.—Basic theory, definitions analytical advantages and applications of x-ray diffraction units are offered in brochure "X-Ray Diffraction for Research, Production Control . . . and Profit."

508. Relief Valves

Fulflo Specialties Co., Blanchester, O.—Mechanical data book provides charts, photographs, drawings and technical information on installation and maintenance of oil-relief, by-pass hydraulic valves.

509. Electric Motors

Century Electric Co., 1806 Pine St., St. Louis 3, Mo.—Applications, types, ratings, dimensions and features of open and enclosed electric motors with capacities from 1/20 to 1 hp are provided in bulletin 1-1P1.

510. Vacuum Die Casting

Kux Machine Co., 6725 North Ridge, Chicago 26, Ill.—Bulletin introduces new Vac-U-Die system of pressure die casting which provides venting of the die by vacuum before injection takes place. The system is available on all models, all sizes of company's die casting machines.

511. Radiant Tube Burners

Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.—Data sheets 808 and 415A provide general information, features, capacities and schematic drawings of a series of radiant tube gas burners and radiant tube burners, dual fuel types, respectively.

512. Detachable couplers

Foster Mfg. Co., 2850 Gravois, Dept. 25, St. Louis 18, Mo.—Catalog presents facts and figures on automatic, semiautomatic and regular chrome sleeve quick detachable couplers for air, oil, and grease lines.

513. Motor Pulleys

Worthington Corp., Harrison, N.J.—Bulletin 1630-B1 P features data on variable speed motor pulleys of ⅛

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412	437	462	487	512	537	562	587	612	637	662	687	712	737
413	438	463	488	513	538	563	588	613	638	663	688	713	738
414	439	464	489	514	539	564	589	614	639	664	689	714	739
415	440	465	490	515	540	565	590	615	640	665	690	715	740
416	441	466	491	516	541	566	591	616	641	666	691	716	741
417	442	467	492	517	542	567	592	617	642	667	692	717	742
418	443	468	493	518	543	568	593	618	643	668	693	718	743
419	444	469	494	519	544	569	594	619	644	669	694	719	744
420	445	470	495	520	545	570	595	620	645	670	695	720	745
421	446	471	496	521	546	571	596	621	646	671	696	721	746
422	447	472	497	522	547	572	597	622	647	672	697	722	747
423	448	473	498	523	548	573	598	623	648	673	698	723	748
424	449	474	499	524	549	574	599	624	649	674	699	724	749
425	450	475	500	525	550	575	600	625	650	675	700	725	750

751	761	771	781	791	801	811	821	831	841	851	861
752	762	772	782	792	802	812	822	832	842	852	862
753	763	773	783	793	803	813	823	833	843	853	863
754	764	774	784	794	804	814	824	834	844	854	864
755	765	775	785	795	805	815	825	835	845	855	865
756	766	776	786	796	806	816	826	836	846	856	866
757	767	777	787	797	807	817	827	837	847	857	867
758	768	778	788	798	808	818	828	838	848	858	868
759	769	779	789	799	809	819	829	839	849	859	869
760	770	780	790	800	810	820	830	840	850	860	870

NAME .....

POSITION .....

FIRM .....

STREET .....

CITY ..... ZONE .....

STATE .....

PRODUCT MANUFACTURED .....

This card good in U.S. and Canada only—Expires Jan. 15, 1957

through ¾-hp available with adjustable and tilting motor bases, companion sheaves, motor bases and V-belts.

514. Welding Rod Chart

American Chain & Cable Co., Page Steel & Wire Division, Monessen, Pa.—Bulletin DH-1218-J details the physical properties, analysis, tensile strength, elongation, average Rockwell hardness and typical uses of gas welding rods, bare electrodes, automatic welding wire and metal spray wire. Comparisons between the Page Division products and virtually all competitive makes are listed.

515. Literature Index

Minneapolis - Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44, Pa.—Bulletin G-2, an index of Industrial Division literature, covers catalogs, bulletins, specification sheets, data sheets, illustrated lectures plus articles from *Instrumentation* magazine.

516. Spectroscopes

Ealing Corp., Box 90, Natick, Mass.—Catalog describes various types of spectroscopes, as diffraction, prism, reversion and ultraviolet and accessories. The new Beck direct-reading spectrometer featuring the reversed spectro technique also is described.

517. Atmosphere Monitors

Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.—Folder N-91-620(1) discusses the application of L&N infrared equipment to monitor CO, CO_2 or CH_4 content of metallurgical atmospheres. Continuous measurement of these gas components from the output of endothermic or exothermic generators or in the furnace itself is described.

518. Chaplets

Cleveland Chaplet & Mfg. Co., 26470 Lakeland Blvd., Cleveland 32, O.—Catalog 56 serves as reference for radiator, motor, boiler and single-head forged and fitted head chaplets. Perforated chaplets and skim gates, chills, core tins and tin ferrule chaplets also are covered.

519. Electric Lift Truck

Lewis-Shepard Products Inc., Dept. 32, Watertown 72, Mass.—Specifications and operating advantages of 2500-lb capacity electric fork lift truck, model JFTT 2.5, are found in circular.

520. Dust Collectors

Zack Co., 4600 West 12th Pl., Chicago 50, Ill.—Design features, cutaway views, specifications and general performance data on dust and fume collectors of various capacities are offered in bulletin 1155.

521. Conveyor Operation

Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich.—Folder, "Ten Rules for Safety in Conveyor Operation," deals primarily with safety rules that should be followed when installing a conveyor.

522. Humidity Instruments

Bristol Co., Waterbury 20, Conn.—Bulletin H1009 describes and illustrates line of humidity recording and controlling instruments and accessories.

523. Industrial Truck Battery

Gould - National Batteries Inc., Trenton 7, N. J.—Bulletin GB 1668-B details line of Super Dreadnought batteries designed to fill power needs of electric industrial trucks. Full details of construction are provided. Engineering specifications for the three ampere-hour capacities available (40, 60 and 120) also are listed.

FOUNDRY Reprints

524. Cast Boron Steel

Mechanical Properties of a Normalized and Drawn Cast Boron Steel by S. L. Gertsman, D. K. Faurschou and R. K. Buhr reports on the mechanical properties of a low carbon boron steel which has high tensile properties in both light and heavy sections after normalizing and is readily weldable.

525. Stack Molding

Production Increased by New Stack Molding Technique by Kenneth L. Mountain briefly outlines and illustrates a simplified stack molding method, developed by Hines Flask Co., Cleveland, that doubles mold production while reducing sand requirements and casting costs.

526. Gage Control

Gage Control for Investment Castings by John E. Ingalls discusses a program of gage control essential for inspection of dimensionally accurate investment castings of complex and intricate shapes.

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CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

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Penton Building
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Reader's Service Dept.

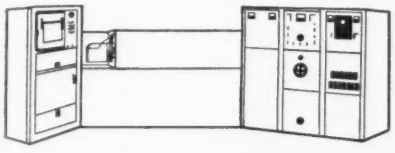
which a replenishing order must be issued. The calculator is said to be useful in any business and has been used successfully, according to the manufacturer, on a wide range of materials and products, regardless of the material, processing or procurement methods.

For More Details Circle No. 417—Page 255

Vacuum Spectrometer

provides rapid analysis from sparking of a single sample

Applied Research Laboratories, Box 1710, Glendale 5, Calif.—Vacuum direct-reading spectrometer is for



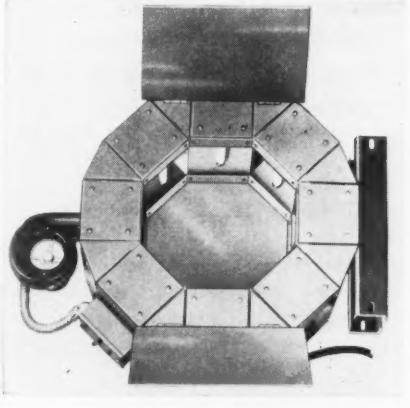
rapid analysis of carbon, phosphorus, sulphur, silicon and manganese in iron and steel from the sparking of a single sample. A sufficient vacuum is attained with a mechanical pump. Tank nitrogen is used around the sample in the excitation stand. For research in analysis of hydrogen, nitrogen and oxygen in metals, the instrument can be adjusted to cover range from 1100 to 3500 angstroms.

For More Details Circle No. 418—Page 255

Laboratory Oven

uses quartz lamps to provide necessary heat intensities

Fostoria Pressed Steel Corp., Fostoria, O.—Laboratory oven for study of heat processing problems incorporates quartz lamps that provide an



intensity of 100 w per inch of lamp length. Oven shown, a typical design for laboratory use, is 16 in. deep with a 13½ in. opening. It holds eight 1600-w quartz lamps and temperatures of about 1000°F are possible when operated at full intensity. At maximum operation with full voltage used, the connected load is 12.8 kw. Back of the oven is closed and the interior is lined with specular gold plating which provides a reflection factor of 97 per cent in directing radiant energy to the product or material being tested.

For More Details Circle No. 419—Page 255

Radiation Pyrometer

Can measure temperatures from 1700 to 7000°F

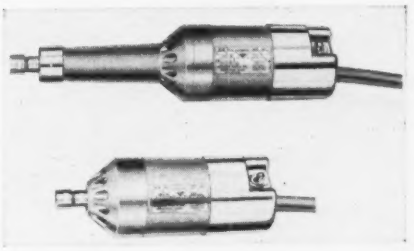
Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44, Pa.—Small target radiation pyrometer is designed primarily for use where the target is small, where the target temperature is so high that a large sighting hole in the furnace would cause excessive heat loss or where the sighting tube must be made of costly material such as platinum. Measurable temperatures are from 1700 to 7000°F and minimum target diams from ⅛ to 6 in., depending upon target distances.

For More Details Circle No. 420—Page 255

High Speed Grinders

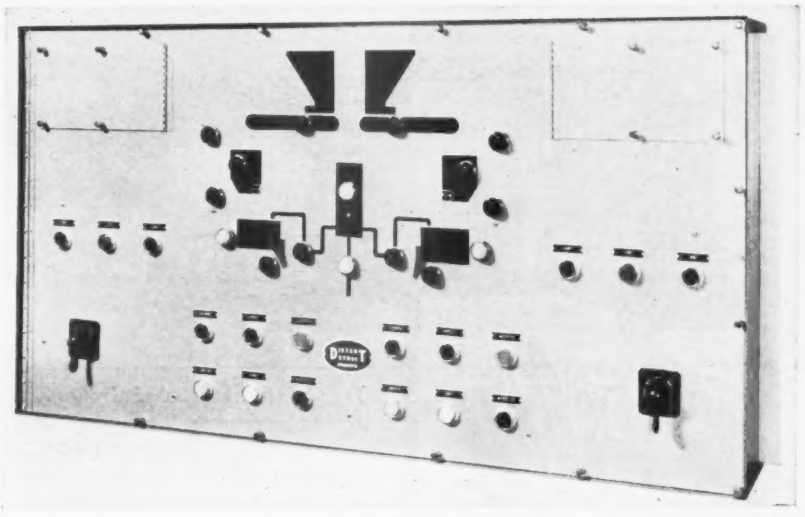
are claimed to be ideal for all hand operations

Millers Falls Co., Greenfield, Mass.—Long nosed and snubby nosed grinders are available in 20,000 and 30,000 rpm speeds. They are said



to be ideal for all hand operations as well as for applications using special jigs and fixtures. Chucking capacity on all four models is ⅛ to ¼-in. Precision collet chucks allow burrs and mounted points to be held close to the bearing. Each grinder is provided with one ⅛-in. arbor, one each ⅛ and ¼-in. collet chucks, one ⅜

Unit Controls All Sand Mixing Operations



COMPLETELY automatic control of every phase of sand mixing operations is made possible by unit that mechanically supervises cycling of sand bin discharge into hopper, hopper discharge into mixer, water into measuring tank, water discharge from tank into mixer, bond hopper discharge into mixer, mixing time and sand discharge from mixer.

Three-way operation with automatic, semiautomatic and manual control is available by positioning a single selector switch. Signal light panel permits operator to follow sequence of operation at a glance from a distance. Unit is designed to "fail safe"—should there be insufficient sand, bond, water or a power failure the muller will not cycle until the stoppage or interruption is cleared and all phases become ready for cycling.

Manufacturer reports that occasional replacement of a solenoid valve is about the only maintenance required. Valves are subbase mounted so that a valve change can be made in less than 90 seconds, reducing down-time to a minimum. The Automull, as the unit is called, is made by Harry W. Dietert Co., 9330 Roselawn Ave., Detroit, Mich.

For More Details Circle No. 458—Page 255

This Simplified Design Will Cut YOUR PIG CASTING COSTS!

Bailey

PIG CASTING MACHINES

Drastically reduced maintenance costs result from the Bailey "stationary wheel" design, which eliminates 80% of the moving parts of ordinary pig casting machines. In this design roller bearing idler wheels are mounted on the frame rather than on the moulds, thus keeping them far as possible away from hot metal.

These machines are used in the casting of ferrous and non-ferrous pigs and ingots.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

x ⅜ x ⅛-in. grinding wheel, two chuck wrenches and 10 ft of rubber-covered, three-wire cord with molded-on plug.

For More Details Circle No. 421—Page 255

Inspection Fluid

uses dye and a detecting apparatus to locate cracks

Zip Abrasive Co., 1360 West Ninth St., Cleveland 13, O.—Two-step inspection process uses dye and a detecting apparatus to locate cracks, fractures, cold shuts, surface fissures,

porosity and imperfect welds on ferrous and nonferrous metals, porcelain, plastics and ceramics. When the dye is sprayed on a surface, cracks as small as 0.0002 in. wide show up after a two-minute dwelling time. Increased dwelling time will reveal still smaller cracks if they are present. A water wash removes the dye. Materail is supplied in aerosol and bulk containers.

For More Details Circle No. 422—Page 255

Safety Spectacles

are attractive in appearance yet rigid to provide safety

Welsh Mfg. Co., 15 Magnolia St., Providence, R. I.—Broader vision, added beauty and assured safety are featured in metal frame safety spectacles that are available with clear or green heat treated glass or plastic lenses. Square-shaped lenses provide increased area of vision and a reinforced member at bridge provides rigidity. Spectacles can be supplied in sizes to meet all requirements.

For More Details Circle No. 423—Page 255

Die Casting Machine

is a hot or cold chamber unit of 600-ton capacity

Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, O.—Hot or cold chamber 600-ton die

*B.G.

and

**A.G.

...two dates malleable founders will remember!

* B.G.—Before Grundite Bond was used. Note pin hole porosity . . . typical on chunky castings and often not revealed until annealing. Pin hole porosity has been proven to be related to the bond used and specifically the release of its chemically combined moisture.

** A.G.—After Grundite replaced the previous bond—the only change made in the sand—all pin holes stopped. Grundite Bond increases mold density with resulting smoother casting finish; faster, easier shakeouts. Scrap losses reduced.

Pin hole porosity and clay bond have known relationship in the production of malleable castings. Pin holes usually appear in heavy metal sections as illustrated (Upper Photo.).

The release of chemically combined moisture from the clay bond at pouring temperatures will vary with the bond. Grundite Bond (Illite Clay) gives up its chemically combined water gradually whereas other bonds release this moisture abruptly. This abrupt release is considered to be the factor which induces pin holes.

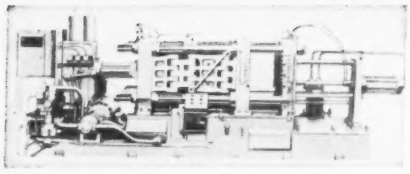
Many malleable founders have proven the relationship between clay bond and pin hole porosity by merely substituting Grundite for their regular bond . . . and obtained results such as shown (Lower Photo.). We are sure you, too, will find Grundite stops pin hole porosity, improves casting finish, speeds up cleaning room time with savings in costs. Write today for a working sample and quotation.

GRUNDITE BOND

A PRODUCT OF

ILLINOIS CLAY PRODUCTS COMPANY

208 S. LaSalle Street Chicago 4, Illinois



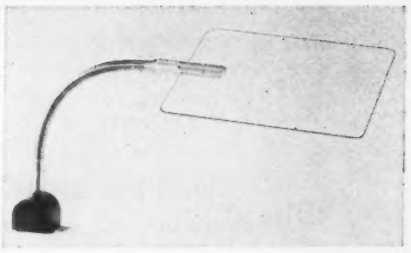
casting machine can handle die plates measuring 46 x 46½ in. Space between tie bars is 28 x 28 in. Minimum and maximum die thicknesses are 10 and 30 in., respectively. Die opening ranges from 8 to 15 in. Universal, automatic timing control panel provides all desirable cycles. Pushbuttons necessary for setup and operation are located within easy reach of the operator. Machine occupies 98 x 246 in. of floor space.

For More Details Circle No. 424—Page 255

Flexible Arm Eye Shield

can be used on tool grinders, lathes or other machinery

Standard Portable Cord Co., Mayville, N. Y.—Eye shield, equipped with a flexible arm, is suited for use on tool grinders, lathes and other machinery where a mounting location is not available close to the work. The



unit incorporates a standard 10 x 12 in. CO-4 cast optics shield and a 45 lb lift Alnico V permanent magnet base. Flexible arm is 12 in. long. Shield also is available with a permanent mounting fixture in place of the magnet base.

For More Details Circle No. 425—Page 255

15 circular magnets by EC&M . . . a size for every need. Write for Bulletin 900-F, describing them.

WITH EC&M LIFTING MAGNETS

A clean sweep of the car bottom gets the entire useable pay load. And for insuring FULL LOADS per lift, there's nothing to equal EC&M ALL-WELDED Lifting Magnets. Welded construction keeps pole shoes tight . . . maintains magnetic path at highest efficiency. Welding also eliminates recesses for pole shoe bolts and gives better proportion for coil space. It takes PULL for handling scrap, pig iron, hot castings . . . and EC&M Magnets have it.

6758

SQUARE D COMPANY
EC&M DIVISION • CLEVELAND 28, OHIO

Portable Compressor

of 85 cfm capacity weighs 1840 lb fully equipped

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.—Company has added an 85-cfm unit to its line of Gyro-Flo compressors to provide six sizes from 85 to 900 cfm. The compressor weighs 1840 lb when fully equipped with tool boxes, fenders and two-wheel spring-mounted running gear. Power is provided by a 4-cylinder, 4-cycle engine with L-head design and individual porting. Pushbutton starting is standard, and ease of starting under all types of conditions is aided by a 6-v battery system.

For More Details Circle No. 426—Page 255

Pan-Link Conveyor

is designed to carry heavy items as castings and turnings

Hapman Conveyors Inc., Kalamazoo, Mich.—Heavy duty, pan-link conveyor uses flat side skirts as links to

insure correct pitch and also serve as sides to contain conveyed materials. Wheels are mounted on an axle rod which passes through a set of double bushings. Smaller diameter

In This Leading Automotive Foundry, 500 to 600 tons of iron go through each of the big receiving ladles daily. A rammed lining of Norton ALUNDUM refractory cement, six inches thick, lasts 10 to 12 weeks, handling an average of 15,000 tons. Only occasional patching is required. The two-ton Crane monorail ladles handle 240 tons per day. Their linings of ALUNDUM cement, four inches thick, average 54 days of service life for a total tonnage of 13,000. About half these smaller ladles require patching, with the same Norton refractory material, after an average of 36 days' service.

Can your linings take this punishment?

Proof that ALUNDUM cement gives long life under heavy duty*

High-melting, long-lasting ALUNDUM cement is just one of many Norton Rx's — refractories *engineered and prescribed* for longer, lower cost service across the range of furnace applications. Others include CRYSTOLON*, MAGNORITE*, and FUSED STABILIZED ZIRCONIA.

For Rx's that will help maintain hot metal schedules and reduce shut-downs in your own furnaces, call in your Norton Refractories Engineer. Or write to NORTON COMPANY, 310 New Bond St., Worcester 6, Mass. *In Canada:* A. P. Green Fire Brick Co., Ltd., Toronto 5, Ontario.

Another Tough Spot for linings is this trough, in the same big automotive foundry. From 500 to 600 tons of molten iron pour through the trough every day. Bottom and sides, from dam to trough end, are lined with ALUNDUM cement. Average lining life is 11 to 12 days, during which approximately 6,000 tons of iron passes through.

NORTON

REFRACTORIES

Engineered... Rx ...Prescribed

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NOMAD
CONVEYOR SYSTEMS

Photograph shows interesting use of Nomad Conveyors to fill a specific condition.

EXPAND Your Operation
and
CONSERVE Floor Space

Nomad Conveyor Systems are the answer to cramped quarters. They provide two conveyors in the space of one. The Double Level Conveyor Track offers valuable space-saving features and maximum flexibility designed to meet *your* needs.

There's economy of space, more work done in less time and reduced scrap. It's high profit-making production and low cost modernization!

Write for the full story. You'll want to order Your NOMAD Conveyors NOW for profits in the months ahead!

NOMAD
FOUNDRY EQUIPMENT

WESTOVER CORPORATION
NOMAD EQUIPMENT DIVISION
3110 W. FOND DU LAC AVE. • MILWAUKEE 10, WIS.

Circle 738 on Inquiry Card—Page 255

BECKER

CARBORISE

(artificial graphite)

A DEPENDABLE, LOW-COST ADDITIVE TO INCREASE CARBON CONTENT...

of uniform quality and carefully controlled mesh to meet your specifications.

"....everything in carbon"

BECKER BROTHERS CARBON CO.
3450 S. LARAMIE AVE. • CICERO 50, ILLINOIS

Circle 739 on Inquiry Card—Page 255

inner bushings are welded to rear edge of the leading apron pan while larger diameter outer bushings at both sides are welded to the leading edge of the following pan. Conveyor sections are made in 10-ft lengths for assembly to any length required. Sections are supplied in heavy duty and extra heavy construction, with pan thicknesses from 12 gage to ½-in. and widths from 16 to 72 in.

For More Details Circle No. 427—Page 255

Pouring Spout

is for use with steel, fibre drums and company's drum lift

Sterling-Fleischman Co., Broomall, Pa.—Plants handling dry material will be interested in pouring spout

developed for use with steel or fibre drums and the company's one-man hydraulic drum lift. The spout is made of 10 gage sheet metal and features a locking band which operates on the "over the center" principle. Other versions of the pouring spout can be furnished on special order.

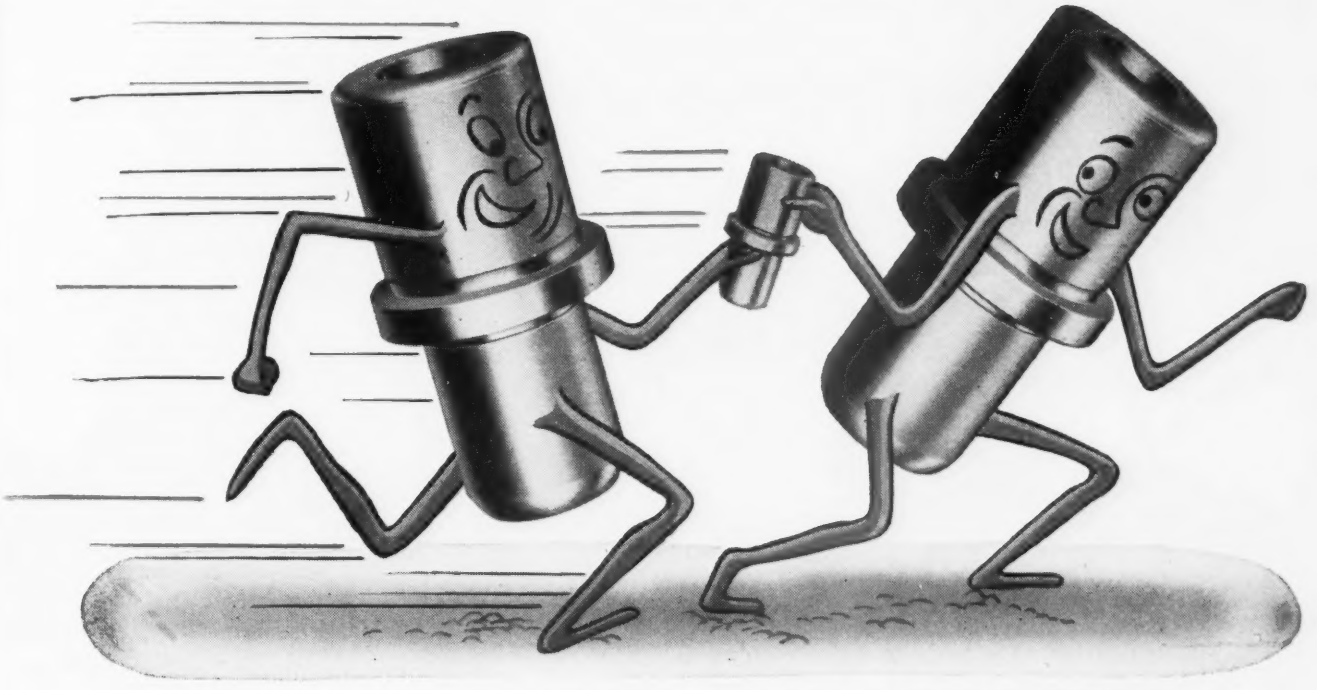
For More Details Circle No. 428—Page 255

Hearing Protector

provides a common sense approach to hearing protection

Sigma Engineering Co., 1491 Vine St., Los Angeles 28, Calif.—Mechanical hearing protector is designed to afford the wearer a condition as close to normalcy as possible by removing the harmful energy from noise while allowing the intelligence of sound to get through in a harmless state. The mechanism is an attenuator of high sound pressures rather than a sound frequency attenuator. Whenever the noise is loud enough to cause harm to ear drum, the energy component of that particular sound is sufficient to actuate the valve in the protector. The actuation of the valve dissipates

QUICK CHANGE WITH UNIVERSAL STANDARD PRESS-FIT FLASK PINS AND BUSHINGS



To compensate for wear in the ear holes of cope and drag, standard size Universal Press-Fit Flask Pins and Bushings are available with three different outside diameters, the second slightly larger than the original size and the third slightly larger than the second. Thus, as the ear holes increase in size—and replacement of the original pins and bushings becomes necessary—pins and bushings with a larger outside diameter are available to provide a good, tight fit in the larger ear holes without welding or other expensive, time-consuming operations. Just drive out the old, press in the new . . . truly "quick change"!

Universal Flask Pins and Bushings of all types are available in a complete range of sizes as regular stock items. Plain, taper, threaded or hexagonal series. For complete information, write to Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis.; or the home office.

186

UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN

TRU-STEEL® SHOT

CONSISTENTLY UNIFORM IN

TOUGHNESS . . .

HARDNESS . .

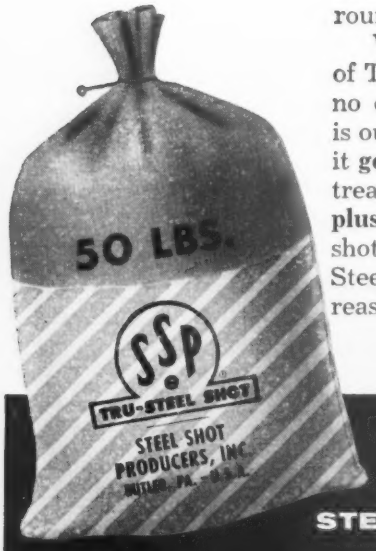
LONG LIFE . . .

EVERY SHIPMENT THE SAME!

You pay more for steel shot than for other types because you expect more from it -- longer life, faster cleaning, lower machine maintenance costs -- lower overall cleaning costs.

Tru-Steel gives you all of that, and does it **consistently** because Tru-Steel is uniform in toughness, and hardness, uniformly round and solid, from one lot to the next.

What makes it so? Well, the making of Tru-Steel is our only business; we make no other type of shot for sale. Tru-Steel is our bread and butter -- we **have** to make it **good.** Modern, unexcelled melting, heat-treating and laboratory-control equipment, **plus** top-notch metallurgists who know shot making as no others do, make Tru-Steel the product of specialists. Isn't it reasonable that it should be better?



TRU-STEEL

Manufactured by

STEEL SHOT PRODUCERS, Inc.

Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

NOW SOLD IN 50-POUND BAGS

Sold and recommended by PANGBORN CORPORATION, Hagerstown, Md.

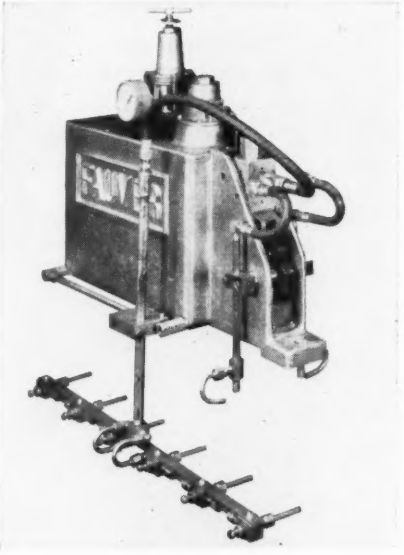
the sound energy and thus the mechanism automatically and properly protects against the harmful sound energy of the noise.

For More Details Circle No. 429—Page 255

Conveyor Lubricators

are a new improved series consisting of three types

J. N. Fauver Co., 51 West Hancock St., Detroit 1, Mich.—Conveyor lubricator in company's 1000 Series



consists of three types of lubricators: Lubricators for trolleys and chains, lubricators for bearings on slat-type conveyors and lubricators for hot zone applications. Improvements in the units include: Mechanism completely enclosed in a nonporous aluminum housing; improved Crown filters and regulators as standard equipment; redesigned trip-mechanism actuates a Hunt valve through a cam.

For More Details Circle No. 430—Page 255

Ice Melting Material

is chloride-free and harmless to metals and vegetation

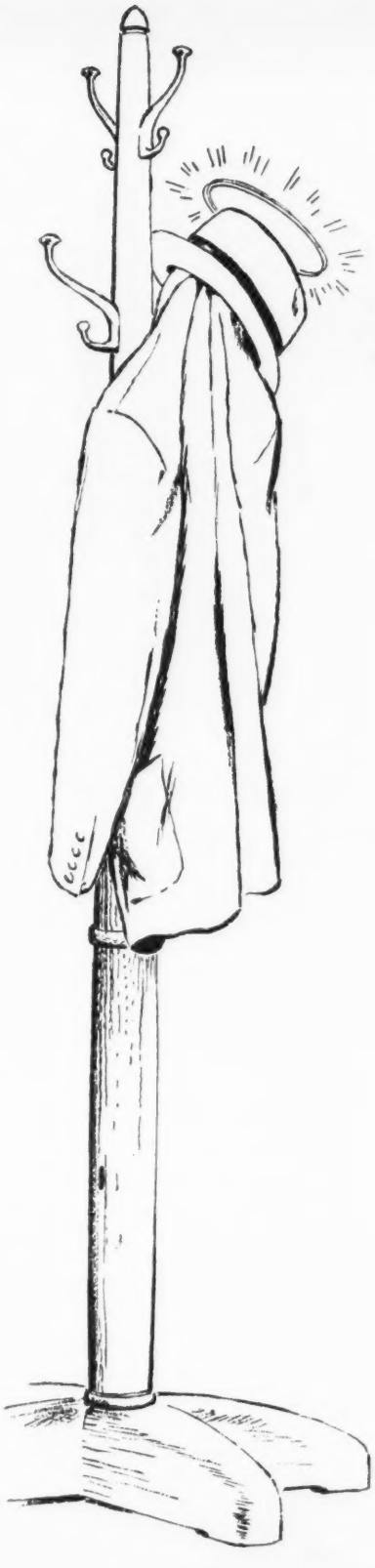
Speco Inc., 7308 Associate Ave., Cleveland 9, O.—Chloride-free ice and snow-melting material is said to be harmless to pavements, metals and vegetation. Known as Ice Rem-CF, the material does not produce a heat effect as part of its melting process. It leaves no residue and will not absorb moisture from the air, according to the maker.

For More Details Circle No. 431—Page 255

Dry Chemical System

is engineered for protection of moderately-sized hazards

Ansul Chemical Co., Marinette, Wis.—Automatic dry chemical fire extinguishing system for flammable liquid, electrical and textile fire haz-



How good is your advertising manager?

There is a quick way to find out—and it's also easy. Just make sure that your organization permits him to *manage* your advertising.

That may seem obvious, but many industrial companies have never taken time to define the functions of the advertising department. As a result, there is confusion. In many cases advertising gets to be little more than a service department, merely producing what other departments ask for.

Your advertising manager should be a full-time player on your marketing team. When sales objectives are set, it is his task to plan and carry out the advertising program which will give the most help in attaining those objectives.

That's what you hired him for. If he isn't permitted to do that, you are wasting his time and talents—and good men in other departments are wasting their time and talents trying to be advertising men.

National Industrial Advertisers Association, Inc.

271 Madison Avenue, New York 16, New York

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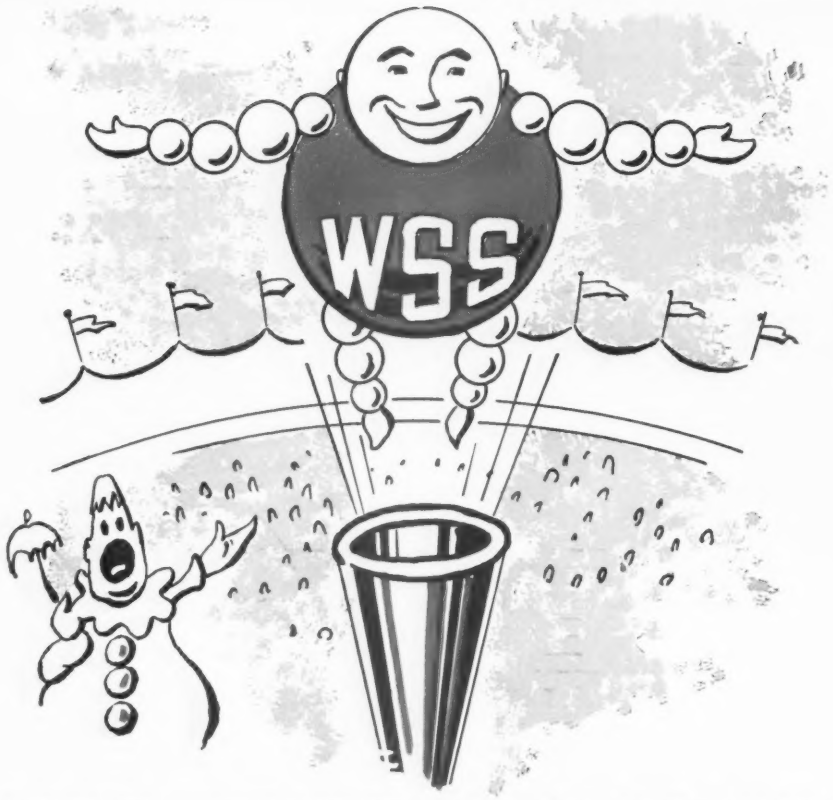


TOP PERFORMANCE

gains over 1,000 new users in 2 years

for WHEELABRATOR® STEEL SHOT

Performance has been the persuader in switching users to Wheelabrator Steel Shot. More than 1,000 users have changed from other abrasives to Wheelabrator Steel Shot in 2 years strictly on the basis of faster, more thorough and more economical cleaning obtained with this premium steel shot. It is the only shot with all the qualities vital to lowest-cost cleaning and peening. Its high hardness gives super cleaning speed. Its toughness gives extra long life for low maintenance costs. The proof that these qualities are facts, not just claims, is in the growing list of users who have changed to Wheelabrator Steel Shot from other abrasives. Try it today. It's the low-cost answer to your cleaning and peening problems.

Wheelabrator Steel Shot is now available in the new S. A. E. size S-280

Write now for your copy of Catalog 89-B.

WHEELABRATOR
CORPORATION

WORLD'S LARGEST MANUFACTURER OF STEEL ABRASIVES

505 S. Byrkit Street Mishawaka, Indiana

ards can be operated either automatically or manually. The PS-30 extinguisher consists of a 30-lb capacity dry chemical unit installed near the hazard and serving as a

storage tank for the dry chemical. Depending upon requirements of the hazard, the system can provide total flooding or local application. Automatic operation occurs when heat of a fire causes a fusible metal link located above the hazard to part. The impulse is transmitted to a release mechanism that punctures a cartridge, pressurizing the extinguisher and forcing its dry chemical charge into the piping leading to the nozzles.

For More Details Circle No. 432—Page 255

Palm Button Valve

is suitable for general use where safety is essential

Ross Operating Valve Co., 107 East Golden Gate Ave., Detroit 3, Mich.—Leakproof palm button valve is suitable for general applications which require a normally closed straightway or three-way hand operated pilot valve. It is designed for circuits where safety is of prime importance. Valve is ¼-in. NPT side ported with an over-all height of 2⅜ in. The three-way model has a nonpiped exhaust and both straightway and three-way models have a ¼-in. diam flow capacity.

For More Details Circle No. 433—Page 255

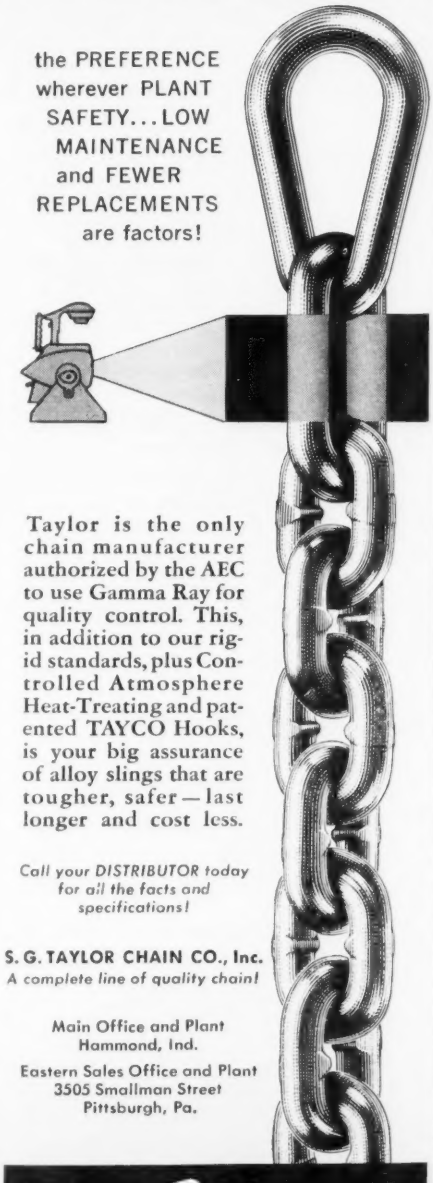
Arc Welder

can be operated on either direct or alternating current

Hobart Bros. Co., Troy, O.—Inert-gas arc welder can be operated on either direct or alternating current, is rated at 200 amps, 40 v and has a current range of 10 to 300 amps;

NEW
GAMMA RAY
QUALITY CONTROL
on master, joiner and end links
makes TM
factory made
ALLOY SLING CHAINS

the PREFERENCE wherever PLANT SAFETY... LOW MAINTENANCE and FEWER REPLACEMENTS are factors!



Taylor is the only chain manufacturer authorized by the AEC to use Gamma Ray for quality control. This, in addition to our rigid standards, plus Controlled Atmosphere Heat-Treating and patented TAYCO Hooks, is your big assurance of alloy slings that are tougher, safer — last longer and cost less.

Call your DISTRIBUTOR today for all the facts and specifications!

S. G. TAYLOR CHAIN CO., Inc.
A complete line of quality chain!

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TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

case has removable side panels, recessed control panel and selector switch which permits operator to choose alternating, direct-straight or direct-reverse welding current. Unit has a magnetic contactor and removable rheostat for remote control as standard equipment.

For More Details Circle No. 434—Page 255

Automatic Gas Valves

in sizes from 1 to 6 in. feature fast, reliable closing

Electronics Corp. of America, Combustion Control Division, Dept. CN-12, 77 Broadway, Cambridge 42, Mass.—Fast closing and slow opening are features of motor-operated automatic gas valves available in sizes from 1 to 6 in. Higher capacities and lower pressure drops are achieved in the valves by full area port and straight-through body design. A compression type spring is said to shut off fuel automatically in 0.8 of a second. An electric drive unit controls rate of opening to reach 75 per cent of maximum fuel flow in 6 seconds.

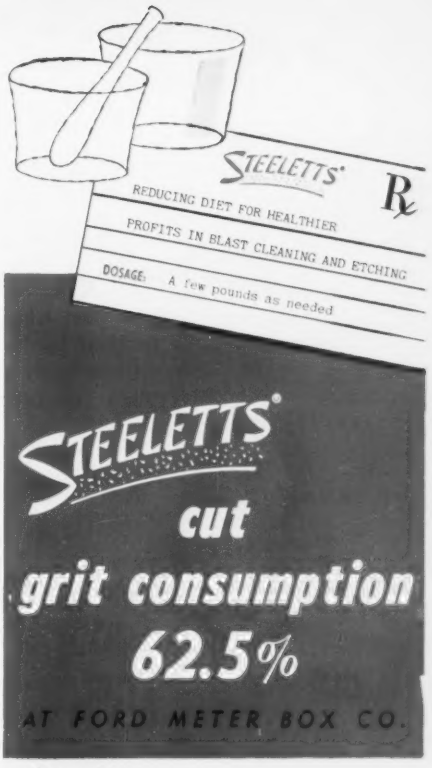
For More Details Circle No. 435—Page 255

Portable Conveyor

is engineered to transport tons of material in minutes

Phillips Conveyor Co., Memphis, Mo.—Portable conveyor is designed to move bulk materials from a floor at a vertical angle. It is available

also with a telescoping landing gear that permits conveying materials at a 45 or 90 degree angle. Unit is powered by a ½ or 2 hp electric motor and is supplied in lengths up to 12 ft for heavier material and longer lengths for lighter material. Buckets are cast aluminum in sizes up to 3½ x 6 in. on centers to meet individual material requirements. Belt speeds are variable. The company manufac-



BEFORE

AFTER

Steeletts have brought the stamina of steel to grit blasting and are rewriting the story of grit consumption. At Ford Meter Box Co. of Wabash, Indiana, for instance, 75 lbs. of Steeletts do the work of 200 lbs. of chilled iron grit in cleaning and etching non-ferrous castings. This 62.5% reduction in abrasive consumption results from Steeletts' resistance to breakdown.

Chilled iron broke down quickly into fine particles which were drawn off by the dust collector, causing frequent addition of new grit. The Indiana firm also reports Steeletts produce a better finish on the castings while reducing abrasive consumption.

Wherever an etched finish is required, Steeletts bring savings in cleaning time, abrasive consumption and equipment maintenance. Let them make savings for you.

Write today for Bulletin No. 901-D.

WHEELABRATOR
CORPORATION

World's Largest Maker of Airless Blast Equipment and Steel Abrasives

505 SOUTH BYRKIT ST. MISHAWAKA, IND.

Circle 744 on Inquiry Card—Page 255

Circle 743 on Inquiry Card—Page 255

tures nine other models of portable conveyors to meet normal material handling problems.

For More Details Circle No. 436—Page 255

Wet Blast Unit

is designed to eliminate wire brushing on cast pistons

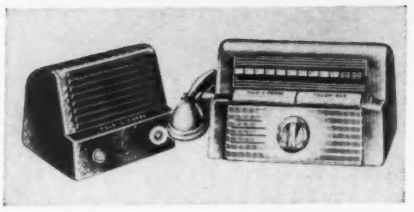
Cro-Plate Co., 747 Windsor St., Hartford 1, Conn.—Automatic, in-line pressure blast unit is designed to eliminate wire brushing on cast iron and aluminum pistons ranging up to 42 lb in weight. Pistons are loaded manually on revolving spindles mounted on stainless steel conveyor chain and indexed into the wet blast position where oscillating guns blast the entire OD area. Pistons then are rinsed free of residual abrasive and sprayed with a water soluble oil. Unloading is manual.

For More Details Circle No. 437—Page 255

Intercommunication Kit

eliminates manual operation of controls during conversation

Talk-A-Phone Co., 1512 South Pulaski Rd., Chicago, Ill.—Series 7700 Talk-A-Phone eliminates the need for manually operating any controls during conversation, yet permits private and selective communication. The new unit provides for voice control, traffic control and monitoring control—all automatically—and makes it unnecessary to use the talk-listen control as in earlier models. The voice automatically operates the talk-listen control, even when conversing with touch controlled units. Series 7600 features automatic touch control and both the 7600 and 7700 series units can be intermixed.



For More Details Circle No. 438—Page 255

Combustion Tube Furnace

is versatile and has a variety of metalworking applications

Lindberg Engineering Co., Laboratory Equipment Division, 2450 West Hubbard St., Chicago 12, Ill.—New 4-kw electric resistance element furnace can accommodate one combustion tube up to 5 in. OD with maximum furnace temperature of 2750°F. In addition to its use as a standard tube furnace, it can be modified for use as a high-temperature pot furnace or a constant temperature source for optical calibrations. Heat is supplied by eight silicon-carbide heating elements having an effective length of 8 in.

For More Details Circle No. 439—Page 255

Protective Skull Cap

is for use in close quarters where head bumps are a problem

Boyer-Campbell Co., Safety Division, 6540 St. Antoine, Detroit 2, Mich.—Skull cap is for use in close quarters where head bumps and lacerations are a problem, as under conveyors, in grease pits or in operations where there is low head room. Cap is light weight and has a padded re-

OLD STYLE GRINDERS
WASTE UP TO 45% OF YOUR GRINDING WHEELS!
AS WHEEL WEARS, SPEED DECREASES, PRODUCTION SLOWS!
STANDARD
INFINITELY VARIABLE SPEED
SNAGGING GRINDERS
adjust automatically with wheel wear to maintain proper peripheral speed.
You get FULL WHEEL WEAR DOWN TO THE FLANGES!

By merely turning a handle — *no tools required* — constant adjustment of wheel speed to compensate for wear is another EXCLUSIVE from STANDARD. STANDARD SNAGGING GRINDER installations coast to coast report wheel savings as high as 100% and increased production of up to 50%. Write today for our "Case History" file of *Savings Up-Cost Down Stories* that are proof positive!

33VR LEFT HAND

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FOUNDRY GRINDER DIVISION

the STANDARD electrical tool co. SINCE 1912

SNAGGING GRINDERS AND MACHINE TOOLS

2507 RIVER ROAD • CINCINNATI 4, • OHIO

HALLMARK OF METALWORKING THROUGHOUT THE WORLD

movable sweatband. An elastic band worn low on the back of the neck instantly adjusts cap to any head size.
For More Details Circle No. 440—Page 255

Spindle Shapers

are portable and can be used anywhere without anchoring

Boice-Crane Co., 907 West Central Ave., Toledo 6, O.—Series 3100 spindle shapers are portable and can be used anywhere without anchoring.

Drive system makes motor installation possible without tools or bolts through use of lug-type motors up to 2 hp. Motor mount is hinged for proper tensioning of three V-belt drives to assure maximum power output. Newly designed controls permit quick set-ups on variety work. The new fence, standard on some models, incorporates many improvements in shaper fence design.
For More Details Circle No. 441—Page 255

DC Rectifier Welder

has both thermostatic and current overload protection

Hobart Bros. Co., Troy, O.—Rectifier welder incorporates new case design to simplify removal of side panels. Recessed control panel has polarity reversing switch, three coarse current adjustments with rheostat control for fine current adjustments. The rheostat can be removed for remote control. Welder has both thermostatic and current overload protection. Unit is available in 300 and 400 amp models.
For More Details Circle No. 442—Page 255

Solenoid Pilot Valves

can handle air, vacuum, oil, water and inert gases

Valvair Corp., 454 Morgan Ave., Akron 11, O.—Small solenoid pilot valves are capable of handling air,

Cup-type Goggles

CESCO RIGHT...before your Eyes!

Chemical Goggles

Spectacle-type Goggles

Plastic Frame Goggles

Cover Goggles

Lite-Specs

Fiber Glass Helmet

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Face Shields

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General Equipment Corporation
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1443 Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
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Guardian Safety Equipment Co.
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Standard Industrial Products Co.
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PHILADELPHIA, PA.
Guardian Safety Equipment Co.
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PITTSBURGH, PA.
Williams & Co., Inc.
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ST. LOUIS, MO.
Safety, Inc.
2608 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
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Approved Respirators

CESCO FOR SAFETY

Here's why Edco Bottom Boards are constructed of Magnesium Alloy

Because of these specific advantages:

- light weight; lighter than wood, metal, steel, iron—and aluminum Bottom Boards too.
- won't break with rough handling—use your Edco Dowmetal Bottom Boards over and over again . . . they're permanent equipment.
- minimum heat retention due to great heat conductivity and radiation which results in rapid cooling.
- increase scrap savings by helping to produce castings true to pattern.

Wood Bottom Boards char, warp, burn easily. Metal boards are heavy; steel boards are unwieldy, costly to handle. Iron boards (even heavier than steel) crack or break if suddenly heated or cooled. Aluminum boards are difficult to clean, often crack because of abuse. And cemented Asbestos-type plates will break at corners and edges. The expense of an under-structure is often required too.

For safe, easy-to-handle, *permanent* equipment in your foundry, remember this fact: each of the 83 standard Edco sizes is constructed of magnesium alloy. Call Edco next time you need "the right Bottom Board."

Write for your free copy of the New Facts File. There's no obligation.

CHRISTIANSEN CORPORATION

210 S. Marion Street • Oak Park 1, Illinois

Phones: MA 6-7330 or EU 3-5050

EDCO DOWMETAL BOTTOM BOARDS
EDCO ALUMINUM CORE PLATES

Please send Facts File including list of 83 standard sizes available from stock.

Name_____

Company_____

Address_____

City-Zone-State_____

Circle 747 on Inquiry Card—Page 255

vacuum, oil, water and inert gases. Capacities range up to 23.8 cfm air and 3.8 gpm hydraulic. Valves are said to be able to control over 600 cycles per minute. Cylinder ports are tapped ¼-in. NPT and electrical conduit connections are tapped ½-in. NPT. Valves can be supplied for direct pipe connection, with sub base, or drilled for mounting on customer's manifold. Solenoid coils are supplied for 3 to 300 v dc, 6 to 550 v ac and 25 to 60 cycles. Maximum solenoid coil current consumption is 10 w.

For More Details Circle No. 443—Page 255

Testing Machines

are for special tension, compression and universal testing

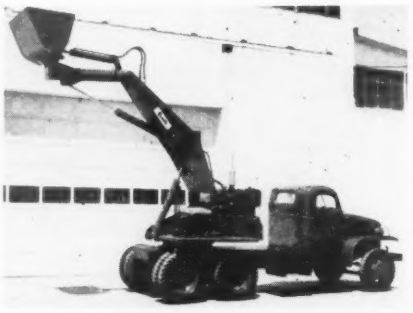
Tinius Olsen Testing Machine Co., Willow Grove, Pa.—Testing machines perform tension, compression, flexure or universal functions in capacities up to 1000 lb. Occupying 5 sq ft of floor space the units can be used for on-the-spot quality control tests on production lines. Load is indicated on a dial mounted on top of the machine. Either of two capacity ranges—full and 1/5 or ¼-capacity—are available at the flip of a range selector switch.

For More Details Circle No. 444—Page 255

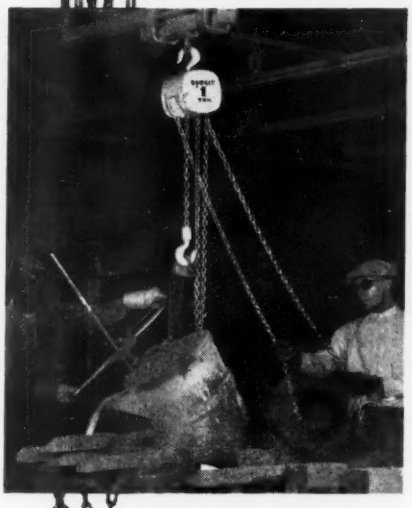
Hydraulic Shovel

is an all-purpose tool with a variety of attachments

Geco Inc., 5701 Colorado Blvd., Box 177, Denver, Colo.—Hydraulic shovel of a design originally developed in Europe now is being made in the United States. The all-purpose tool has these attachments: ⅜-yd backhoe, ⅝-yd front dump bucket, ⅜-yd rock bucket, ⅝-yd gravel bucket, ½-yd clamshell and 6500-lb crane hook. One man can make a change of attachments in ten minutes, according to the manufacturer. Outstanding features of the shovel are a precision-built ball bearing turntable and heavy-duty hydraulic system. There are 14 lubrication fittings on the machine, requiring only a few minutes per day to service. The unit has 360-degree continuous rotation, left



"HAIR'S BREADTH" CONTROL



SAVES FOR FOUNDRIES

It takes delicate handling to avoid spoilage and damage losses. That is why the 'Budgit' Aluminum Chain Block is so widely favored by foundry men. It has a smooth operating, fast-acting brake that controls lowering accurately.

Safeguard your production. Use the 'Budgit' Aluminum Chain Block to set cores and draw patterns, to pour off and close flasks. It is portable—the ideal one-man hoist for maintenance as well as general lifting jobs. Wherever you use the 'Budgit', you get fast, safe hoisting with little muscle effort. Capacities: ¼ to 10 tons. *Your Shaw-Box Distributor* will gladly tell you all about the toughest light-weight chain block ever built. Or ask us for Bulletins 405 and 415.

AN I-BEAM TROLLEY adds travelability to any hoist. All types available. Capacities: ¼-ton up. Priced from $19.50. Ask for bulletin.

'Budgit'® CHAIN BLOCKS

MANNING, MAXWELL & MOORE, INC.
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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

Circle 748 on Inquiry Card—Page 255

MELTRITE PIG IRON

Strictly Merchant

Great productive capacity. Entire production for sale at all times. Strategic location of the five plants. Quality of product. These are but four reasons why *more* MELTRITE is used than any other merchant pig iron.

MELTRITE is made to the required analysis for the particular need. Specifications are met for many different grades.

SERVICE DEPARTMENT AVAILABLE WITHOUT OBLIGATION

Five favorably located plants in Erie, Toledo, Chicago, Duluth.

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PICKANDS MATHER & CO.
CLEVELAND 14, OHIO
Chicago • Cincinnati • Detroit • Duluth
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IRON ORE • PIG IRON
COAL • COKE • FERROALLOYS

Circle 749 on Inquiry Card—Page 255

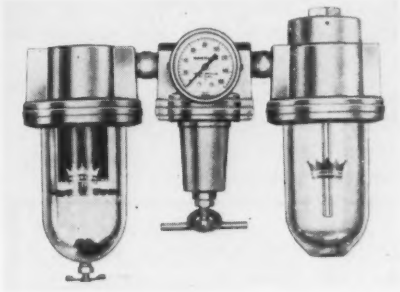
or right, on an almost frictionless ball bearing turntable. It can be mounted on any 2-ton or larger truck.

For More Details Circle No. 445—Page 255

Filter-Regulator

is for use in compressed air lines throughout industry

Hannifin Corp., 638 South Wolf Rd., Des Plaines, Ill.—Crown line of filters, regulators and lubricators is designed for use in compressed air



lines on air cylinders, air presses and air tools. Units are said to provide maximum air flow capacity for their rated pipe sizes. Seven styles in five pipe sizes ¼ to 1 in. are available. The regulator is offered in 1¼ and 1½ in. pipe sizes also.

For More Details Circle No. 446—Page 255

Battery Tray Finish

expedites on-the-spot repairs without time lost in baking

Exide Industrial Division, Electric Storage Battery Co., 42 South 15th St., Philadelphia 2, Pa.—Air-drying, protective finish for steel battery trays reportedly has excellent adhesion and electrical insulating properties while being resistant to abrasion and acid. The quick-drying finish, called Flexide, can be applied with brush or spray gun and permits the battery user to repair scratched or damaged surfaces and provide continuous tray protection. Flexide is compounded of a plastic-base material that is impervious to battery acid.

For More Details Circle No. 447—Page 255

Solenoid Valves

shut off automatically and instantly upon power failure

Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.—Safety shut-off, manual-reset solenoid valves are used in gas supply lines to boilers, furnaces, ovens and other fuel equipment to shut off the fuel automatically and instantly upon power failure. The valves are designed to control flow of manufactured, natural and LP gases in a maximum

MILWAUKEE COKE SOLVAY

Highest Quality Foundry Coke

MILWAUKEE SOLVAY is highest quality coke—and has been for over 50 years—because it is made only from carefully selected coal purchased for one reason—to make the *best* foundry coke.

Resistant to shatter and abrasion, high in carbon and low in sulphur and ash, MILWAUKEE SOLVAY is screened to the correct size for your requirements. It is always in dependable supply.

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IRON ORE • PIG IRON
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Circle 750 on Inquiry Card—Page 255

ambient temperature of 104°F. They also can be used to handle various grades of fuel oil and noncorrosive liquids and gases. Sizes available are from ¾ to 6 in. IPS to handle pressures from 25 to 100 psi.

For More Details Circle No. 448—Page 255

Hydraulic Fluid

is for systems operating at temperatures above 150°F

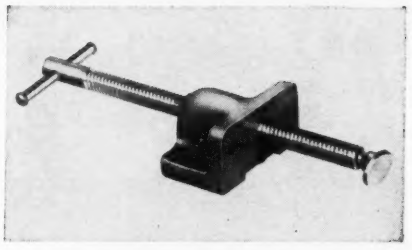
E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.—Fire-resistant hydraulic fluid has been compounded for systems operating at temperatures above 150°F and for heavily loaded pumps and bearings. The fluid—Houghto-Safe 1020—is a synthetic material fortified with rust preventives and antifoaming agents.

For More Details Circle No. 449—Page 255

Fixture Lock

simplifies and speeds many routine clamping jobs

Wilton Tool Mfg. Co., 9525 Irving Park Rd., Schiller Park, Ill.—Routine clamping jobs can be speeded and simplified with a jig and fixture device that features automatic clamping and release and positive screw tightening. Free sliding action of the screw makes it possible to save time and maneuver the work piece easily. The continuous tightening feature enables the operator to secure the work safely in machines, on benches or in special fixtures. Front and bottom of the body are machined flat to a 90 degree angle and mounting holes are provided in both faces. The screw is cadmium plated and has a travel of 6¼ in.



For More Details Circle No. 450—Page 255

Industrial X-Ray Units

are adaptable to most voltages found in industrial plants

Mitchell Radiation Products Corp., 128 East Washington St., Norristown, Pa.—Four portable industrial x-ray units for radiographic inspection of castings, welds and assemblies are adaptable to most voltages encountered in industrial plants. Three of the units, Models MS-200, MS-260 and MS-300 are for heavy duty work while the fourth unit, Model MS-140, is a small trepanning unit for spot examination of welds and light radiography. All are dustproof, waterproof and shockproof.

For More Details Circle No. 451—Page 255

Safety Glasses

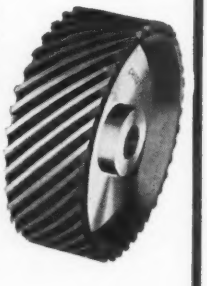
feature plastic hook-on temples that telescope to aid fit

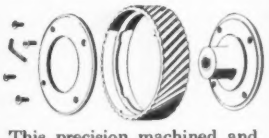
Watchemoket Optical Co., 232 West Exchange St., Providence 3, R. I.—Plastic temples for use on Tuc-Away and Visor-Tuc safety spectacles rotate through 360 degrees and telescope in and out to enable fit by

Thoroughly Dependable...

PROVED BEST!

The R54 contact wheel has proved again and again in shops all over the country and abroad that our original claim "cuts cost like magic" is really doing just that. It cuts better, faster, longer and increases abrasive belt life—for substantial savings. And equally important—better quality work. Write for descriptive literature.



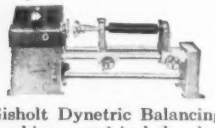


This precision machined and accurately balanced wheel is easily and quickly knocked down and reassembled for economical tire replacement or change.

You replace only the tire when necessary and not the entire wheel. Choose from a complete assortment of treads in a wide variety of Durometers to best suit your grinding or polishing requirements. Our engineers will gladly make specific recommendations.

DYNAMICALLY BALANCED

All Chicago Rubber wheels are assured perfect dynamic balance for safety and efficiency on the job.



Gisholt Dynetric Balancing machine—used in balancing all Chicago Rubber rolls.

RUBBER ROLLERS FOR EVERY JOB

Rollers for every specific job—for steel, tin plate, paper and textile mills and all operations where high quality rubber rollers are used. Dynamically balanced, available in a wide variety of Durometers. These rolls are made in various diameters and serrations to suit any polishing requirements.

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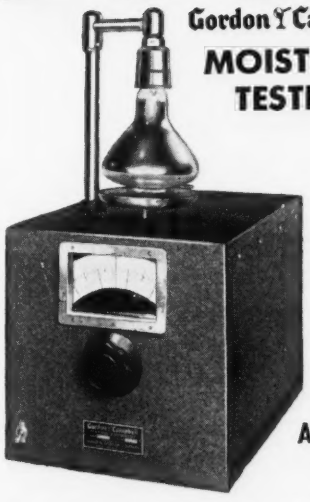
Guessing Moisture Content?

IT DOESN'T PAY!

USE THE Gordon-Campbell MOISTURE TESTER



ACCURATE FAST

The moisture content of sand mixtures is too important a factor in the production of good castings to be determined by guesswork. Frequent testing is the only sure guide to maintaining the most favorable moisture percentage.

The Gordon-Campbell Moisture Tester offers an easy, fast, accurate method of finding moisture content. With only a few minutes required for a test, the sand can be corrected promptly to avoid scrap losses.

Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units.

Gordon-Campbell sand testing units conform to the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

FREE TO ANY FOUNDRYMAN

Write for this booklet. It explains foundry sand control and how to reduce scrap losses.

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers • Engineers • Distributors

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Circle 752 on Inquiry Card—Page 255

the wearer without use of tools. In normal use, the manufacturer claims the hooks are virtually unbreakable. The hooks rest comfortably and snugly against the head and retain their position through substantial friction produced by the close fit of the plastic hook into the plastic temple.

For More Details Circle No. 452—Page 255

Tracing Table

is less than 2 in. thick, lightweight and portable

Porta-Trace Inc., 342 Clinton St., Dept. F., Binghamton, N. Y.—Tracing table for engineers, photographers, x-ray technicians, designers and artists is 1 7/16-in. thick, portable, easy to store, yet strong enough to permit tracing on Bristol board. Flush Plexiglas top provides for light diffusion with minimum glare and fluorescent lighting gives high light output with minimum heat. Rubber feet on bottom of unit keep it stationary on tilted drawing or drafting boards. Four sizes are made from 11 x 18 in. to 24 x 36 in.

For More Details Circle No. 453—Page 255

Hand Trucks

are lightweight but incorporate heavy-duty features

Milwaukee Truck Co., 250 North 12th St., Milwaukee 3, Wis.—Two-wheel hand trucks for heavy-duty use in industrial material handling can handle payloads up to 600 lb. Three heavy-duty models are available from company's line of 16 models. All three are built of 1-in. tubular steel. Three different frame and handle styles are offered for varying job requirements. Semipneumatic wheels are equipped with roller bearings. Wheel equipment includes grease fittings for positive lubrication.

For More Details Circle No. 454—Page 255

Conveyor Loader

makes material unloading one continuous flow operation

Lance Iron Works, Box 310R3, Chicago Heights, Ill.—Material handling to and from transport media is automated into one continuous flow operation with an automatic, self-contained conveyor unit. Lanceveyor, as the unit is called, is set into the user's present system and by means of an automatic control circuit may be extended through dock door onto trucks, permitting direct handling to or from the truck or other carrier. Unit is extended or retracted automatically.

For More Details Circle No. 455—Page 255

Produce More Top Quality Castings with Top Quality FOUNDRY MATERIALS

Use these Time-Tested Products for Best Results

SAND

Portage (Wis.) Silica
Century Molding
*Ottawa Blackhawk Silica
Muskegon Lake Sand
Tenn. & Ind. Molding
Utica Crude Silica
Green Lake Shell
*Zircon Sand, Flour and Wash
Berlin Core Sand
Red Flint Annealing
New Jersey Molding
Gallia Red Molding
Albany Molding

BONDING CLAYS

*Volclay, MX-80 (Granular)
*and Panther Creek Bentonite
*Goose Lake Fire Clay
*Grundite Bonding Clay

ABRASIVES

*Tru-Steel Steel Shot
Mallan' Steel Shot and Grit
*Malleabrasive Shot and Grit
*Certified Shot and Grit
*Blackhawk Sand Blast Sand
*Super-Titan Nozzles

REFRACTORIES & MISC.

Cargan Cupola Gun Mix
Firegan Ganister
*Microsil Silica Flour
Fluxing Limestone
*Five Star Wood Flour
*Sultron Foundry Flux
Fluorspar—Lump & Gravel

* Whse. Stocks carried

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Circle 753 on Inquiry Card—Page 255

Leaders in Iron & Steel Scrap Since 1889

For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.

Luria Brothers and Company, Inc.

main office **PHILADELPHIA NATIONAL BANK BUILDING,** *Phila. 7, Pa.*

PLANTS

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IMPORT & EXPORT — **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Foundry Statistics

ALUMINUM

(Shipments of castings—1000 pounds[1])

	Shipments				Unfilled Orders[2]
	Total	Sand	Perm. Mold	Die	
1954	624,973	158,473	214,408	245,291	.....
1955					
July	55,033	11,716	21,006	21,656	101,024
7 mo.	478,487	97,868	176,340	199,328	.....
Aug.	64,864	14,916	22,267	27,004	105,994
Sept.	67,069	14,769	23,075	28,532	111,696
Oct.	72,197	14,485	25,135	31,741	120,222
Nov.	75,065	14,327	26,267	33,852	126,954
Dec.	75,275	15,291	25,031	34,347	123,363
Total	832,957	171,656	298,115	354,804	.....
1956					
Jan.	74,152	15,861	24,528	33,253	121,924
Feb.	73,096	15,560	23,963	32,949	115,958
Mar.	73,785	16,597	22,816	33,965	110,642
Apr.	67,880	14,732	20,718	31,782	106,477
May	65,786	15,570	19,699	29,814	102,121
June	58,189	13,448	19,067	25,027	102,068
July	52,955	12,398	16,388	23,491	106,620
7 mo.	465,843	104,166	147,179	210,281	.....

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments		Standard		Pearlitic		Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	
1954	812,016	461,982	.....	.....	.....	.....	.....
1955							
July	75,570	44,914	.....	.....	.....	.....	115,420
7 mo.	668,906	392,020	.....	.....	.....	.....	.....
Aug.	82,448	48,126	.....	.....	.....	.....	123,473
Sept.	87,215	55,471	.....	.....	.....	.....	116,636
Oct.	90,866	53,804	.....	.....	.....	.....	121,261
Nov.	99,280	58,069	.....	.....	.....	.....	116,981
Dec.	99,946	60,409	.....	.....	.....	.....	123,107
Total	1,104,775	652,552	.....	.....	.....	.....	.....
1956							
Jan.	93,562	54,618	79,406	45,747	14,156	8,871	116,520
Feb.	93,533	54,466	80,601	47,606	12,932	6,860	113,616
Mar.	86,941	46,266	75,384	40,869	11,557	5,397	106,491
Apr.	83,320	47,064	72,763	41,449	10,557	5,615	99,573
May	80,138	51,053	69,593	44,424	10,545	6,629	93,677
June	75,635	45,022	66,300	26,791	9,335	5,513	86,247
July	54,340	31,300	45,977	26,881	8,363	4,419	92,078
7 mo.	567,469	329,789	490,024	273,767	77,445	43,304	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1954	835,930	753,179	48,848	.....
1955				
July	65,816	59,138	3,998	48,085
7 mo.	565,118	507,431	35,428	.....
Aug.	87,206	77,721	5,322	51,251
Sept.	89,600	80,481	5,603	57,313
Oct.	91,192	82,958	4,513	56,751
Nov.	90,345	80,934	5,807	57,049
Dec.	88,287	78,327	6,368	57,146
Total	1,011,748	907,852	82,201	.....
1956				
Jan.	89,767	80,116	6,135	58,445
Feb.	91,706	82,244	5,888	57,515
Mar.	96,085	85,094	6,299	65,560
Apr.	90,679	81,333	5,835	68,106
May	89,188	80,105	5,448	58,789
June	78,921	70,260	5,052	55,019
July	60,926	55,027	3,193	59,661
7 mo.	597,272	534,179	37,850	.....

MAGNESIUM

(Shipment of castings—1000 pounds[1]

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1954	25,777	22,950	.....
1955			
July	1,920	1,763	5,912
7 mo.	16,356	14,827	.....
Aug.	2,176	2,002	5,964
Sept.	2,478	2,260	5,670
Oct.	2,302	2,077	5,394
Nov.	2,325	2,148	5 805
Dec.	2 255	2,018	5,981
Total	27,892	25,332	.....
1956			
Jan.	2,959	2,600	6,237
Feb.	2,977	2,720	6,704
Mar.	3,046	2,842	6,414
Apr.	3,140	2,949	7 137
May	3,021	2,801	7,293
June	2,949	2,765	7,850
July	2,810	2,666	7,937
7 mo.	20,902	19,343	.....

PRODUCTION WORKERS

Estimated Number

	July 1956	June 1956	July 1955
Ferrous	201,600	202,800	201,300
Nonferrous	60,500	60,900	61,900

Average Weekly Earnings

Gray Iron	82.41	82.42	83.42
Malleable Iron	80.99	78.38	80.39
Steel	93.66	95.87	84.87
Nonferrous	89.13	87.05	82.81

Average Weekly Hours

Gray Iron	40.2	40.4	41.5
Malleable Iron	39.7	38.8	40.6
Steel	42.0	42.8	41.0
Nonferrous	40.7	40.3	40.2

Source: Bureau of Labor Statistics

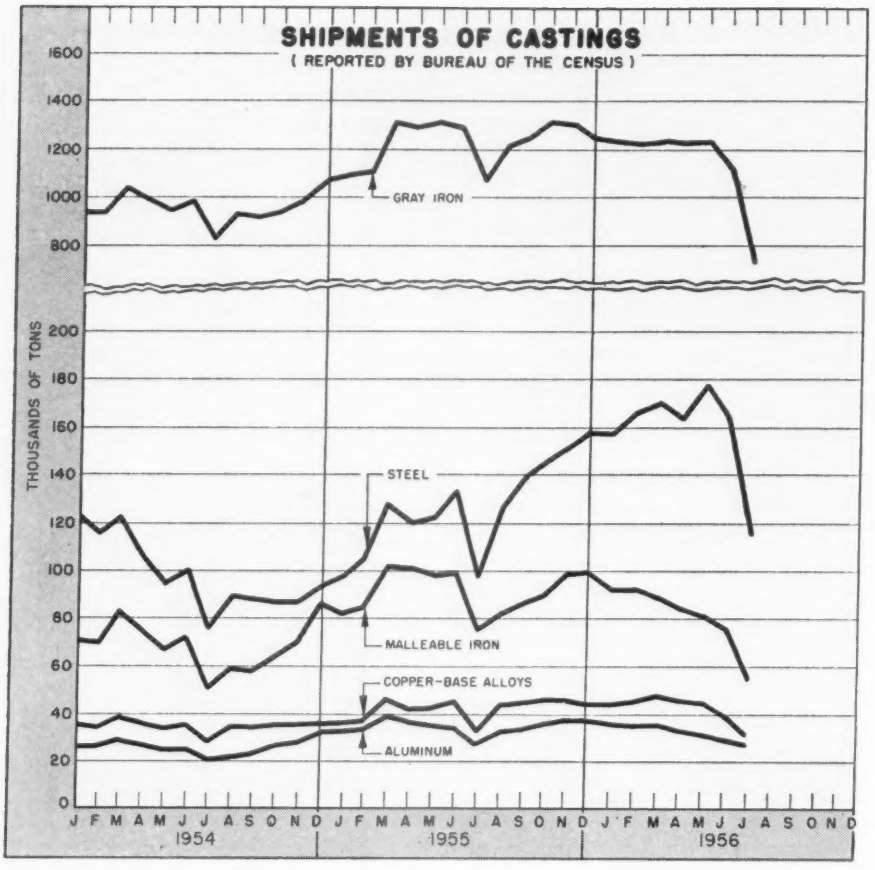
GRAY IRON CASTINGS—SHIPMENTS (Net Tons[1])

	All Castings		Miscellaneous Castings		Heavy Steel Ingot Molds		Chilled Railroad Car Wheels	Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	Total	Total[3]	Total[3]	
1954	11,532,158	6,322,989	7,292,292	3,064,886	1,784,625	843,899	325,859	1,376,671	743,711	.....
1955										
July	1,069,711	579,122	634,869	246,297	210,130	112,137	28,181	129,191	67,340	1,049,565
7 mo.	8,709,500	4,648,753	5,490,178	2,197,609	1,505 261	768,341	248,911	935,014	530 136	.....
Aug.	1,226,312	688,317	718,423	301,502	238,007	121,071	29,298	156,074	84,510	1,160,466
Sept.	1,252,736	712,688	731,073	314,223	244,199	124,811	29,953	165,332	82,179	1,150,933
Oct.	1,310,309	713,671	795,875	327,827	245,749	122,722	31,877	160,875	75,923	1,113,336
Nov.	1,305,633	696,523	797,854	327,580	262,506	127,739	29,795	148,560	66,918	1,061,546
Dec.	1,259,740	633 993	786,480	328,445	262,056	133,115	30,833	133,935	46,436	1,075,477
Total	14,837,745	7,987,205	9,161,685	3,715,963	2,739,864	1,392,209	385,041	1,681,630	869,558	.....
1956										
Jan.	1,249,518	677,017	769,826	326,269	257,150	132,581	32 408	131,346	58,788	1,157,818
Feb.	1,214,769	680,494	739 786	322,956	242.207	128,643	35,074	133.254	64,448	1,140,765
Mar.	1,255,405	715,173	752,498	331,749	254,045	139,624	42.676	132,384	73,802	1,162 578
Apr.	1,218,000	702,145	719,109	314,968	237,486	130,473	39,325	151,670	70,410	1,144,870
May	1,235,631	737,081	702,834	321,413	213,719	131,294	38,419	171,859	78,800	1,086 122
June	1,152 156	686,896	656,778	298,578	217,135	102,405	34,028	170,122	74,093	1,041,315
July	762 611	487,736	509,702	241,771	9,556	7,003	32,484	144,964	65,905	1,109,069
7 mo.	8,088,090	4,686,542	4,850,533	2,157,704	1,461,298	772,023	254,414	1,035,599	486,246	.....

STEEL CASTINGS—SHIPMENTS (Net Tons[1])

	All Castings			Carbon			Alloy			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1954	1,184,096	880,158	135,581	802, (321	580,474	120,309	381,285	303 428	15,315	.....
1955										
July	97,875	71,170	11 631	68.094	48,140	10,666	29,781	23,030	965	354,628
7 mo.	842,520	644,563	122,287	587,914	439.241	112,486	257,980	205,322	9,801	.....
Aug.	126,406	96,290	20,576	91,245	68,514	19,094	35,161	27,776	1,482	413,531
Sept.	140,843	107,622	23,594	100.775	76,156	21,991	40.068	31,466	1,603	420,616
Oct.	145,674	110,409	23,745	105,345	79,235	22,375	40.329	31,831	1,370	418,063
Nov.	152,381	116,908	25,635	111,571	84,064	24,050	40.810	33,518	1,585	453,113
Dec.	158,982	122,201	29,003	116.872	88,894	26,919	42,110	33,307	2,084	475,335
Total	1,530,694	1,166,706	236,880	1,088,489	814,258	219,602	445,769	354,452	17,278	.....
1956										
Jan.	158,618	123,343	27,954	116,092	88,480	26,362	42,526	34,863	1,592	519,401
Feb.	165,398	128,598	30,833	123 279	94,998	29,112	42.119	33,600	1,721	567,330
Mar.	170,045	130.839	31,991	126 583	95,779	29,953	43,462	35,060	2,038	594,990
Apr.	163,708	125,015	27,475	121,723	91,332	25,302	41,985	33,683	2,173	600,242
May	178,227	142,025	35,949	134 919	107,575	33,695	43,308	34,450	2,254	608,275
June	164,661	129,147	31,296	122,483	95,621	28,801	42,178	33,526	2,495	597,103
July	117,984	96,350	19,833	88,971	72,837	18,545	29,013	23,513	1,288	611,233
7 mo.	1,118,641	875,317	205,331	834,050	646,622	191,770	284,591	228,695	13,561	.....

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.



COKE PRODUCTION AND CONSUMPTION

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1954	59,526,723	59,139,159	2,479,926
1955			
July	6,169,770	6,266,631	221,372
7 mo.	42,316,189	42,987,072	1,790,244
Aug.	6,395,422	6,439,101	249,425
Sept.	6,397,133	6,501,013	260,608
Oct.	6,630,609	6,813,118	283,818
Nov.	6,545,862	6,577,008	285,021
Dec.	6,865,032	6,949,073	284,936
Total	75,150,247	76,266,385	3,154,052
1956			
Jan.	6,914,836	6,182,704	275,660
Feb.	6,476,135	6,506,044	260,949
Mar.	6,896,593	6,861,698	267,414
Apr.	6,633,363	6,572,836	247,664
May	6,725,396	6,587,030	241,558
June	6,235,691	6,163,668	214,484
July	2,273,127	1,583,766	193,457
7 mo.	42,155,141	40,457,746	1,701,186

INGOT BRASS AND BRONZE

(Shipments in net tons)

	1955	1956
Jan.	25,201	27,736
Feb.	25,349	24,949
Mar.	29,713	28,310
Apr.	27,641	25,808
May	23,708	23,437
June	23,141	18,842
July	18,513	17,364
Aug.	27,013	23,812
Sept.	26,349	.....
Oct.	25,228	.....
Nov.	25,102	.....
Dec.	21,448	.....
Total for year	298,406	166,466

Source: Defense Council of the Ingot Brass and Bronze Industry

ZINC-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1954	520,501	322,845	.....
1955			
July	47,928	27,429	68,927
7 mo.	438 809	269,196	.....
Aug.	62,677	61,957	75,592
Sept.	62,030	43,498	80,660
Oct.	71,689	46,581	85,489
Nov.	75,099	47,572	93,001
Dec.	70,950	47,547	86,120
Total	781,254	516,351	.....
1956			
Jan.	68,050	43,750	83 234
Feb.	66,854	42,300	76,283
Mar.	65,760	42,806	73,025
Apr.	58,274	37,518	71,730
May	52,205	33,920	60,634
June	47,775	31,983	61,809
July	42,227	27,301	64 806
7 mo.	401.145	259.578	.....

INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1955	1956
Jan.	81.0	195.6
Feb.	90.4	169.0
Mar.	163.6	152.7
Apr.	178.6	135.2
May	145.7	207.0
June	186.8	156.7
July	213.4	110.3
Aug.	134.0	....
Sept.	156.7	....
Oct.	108.6	....
Nov.	154.4	....
Dec.	183.9	....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent monthly average. This is a new base period. Source: Foundry Equipment Manufacturers Association.

IRON AND STEEL SCRAP CONSUMPTION

(Gross tons*)

	All Scrap Total	By Types of Furnace: Cupola Total	Air Total	Electric Total
1954	54,780,758	8,542,581	855,207	6,100,444
1955				
June	6,117,573	928,908	116,419	733,573
6 mo.	35 852,777	5,498,154	630,194	4,124,292
July	5,447,130	730,735	81,216	623,623
Aug.	5,913,031	868,644	101,607	765,343
Sept.	6,060,491	881,158	119,550	753,318
Oct.	6,443,349	944,685	113 411	820,642
Nov.	6,441,351	952,906	112,056	839,971
Dec.	6,496,796	910,675	115,436	830,404
Total	72,654,925	10,786,957	1,273,470	8,757,593
1956				
Jan.	6,688,977	909,201	114,378	880,980
Feb.	6,345,421	892,373	116,418	833,661
Mar.	6,733,076	923,912	101 087	863,950
Apr.	6,490,680	862,233	96,514	842,216
May	6,491,567	855,007	104,485	899,967
June	5,994,989	776,299	87,525	831,456
6 mo.	38.744.710	5.219.025	620,407	5,152,230

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons): Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace—gross tons): Total	Cupola	Air	Electric
1954	58,113,924	2,241,436	2,798,646	47,485,047	5,587,465	52,373,541	4.364,418	215,158	155,258
1955									
Aug.	6,529,580	251,459	319,951	5,214,901	743,269	5,769,689	442,532	22,014	25,685
8 mo.	49,967,865	1,854,749	2,544,403	40,399,598	5,179,115	43,743,777	3,496,881	167,868	158,407
Sept.	6,653,578	252,630	343,919	5,397,134	659,895	5,903,190	445,099	23.340	24,552
Oct.	6,905,280	267,405	315,045	5,647,527	675,303	6,193,512	470,610	22.659	23,328
Nov.	6,636,649	241,727	353,713	5,404,584	636,625	5,973,223	469,485	22,621	18,148
Dec.	6,887,667	242,446	329,607	5,660,307	655,307	6,131,680	444.459	23.529	21,971
Total	77,114,073	2,858,957	3,884,971	62,570,394	7,799,751	68,944,698	5,326,534	260,008	246,406
1956									
Jan.	6,985,945	210,755	317,216	5,806,140	651,774	6,275,224	441.634	24.062	11,766
Feb.	6,539,199	229,440	370,208	5,350,650	588,901	5,871,824	430.792	24,307	13.010
Mar.	7,083,877	196,533	352,856	5,843,852	690,636	6,316,836	427.177	23.737	18,725
Apr.	6,860,833	210,319	333,660	5,623,647	693,207	6,077,074	413.537	22.757	17.179
May	6,873,102	232,375	329,750	5,625,067	685,910	6,064,632	413.494	24.074	28.596
June	6,387,608	213,769	331,871	5,227,488	614,480	5,642,004	379,803	22,039	23,460
July-Aug.	6,190,197	337,077	382,369	4,854,291	616,450	.....	.....	.....	.....
8 mo.	46,920,761	1,630,268	2,417,990	38,331,135	4,541,358	.....	.....	.....	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.

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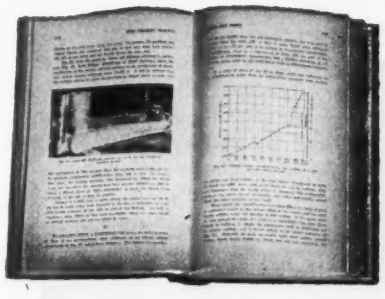

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ABOUT THE AUTHOR

The late John Howe Hall was associated with the production of steel castings for nearly 50 years. Mr. Hall received his bachelor's and master's degrees from Harvard University. He was employed by Bethlehem Steel Co. and Buffalo Crucible Castings Co. until 1906, when he joined Taylor-Wharton Iron & Steel Co. He remained there until 1937, when he became a consulting metallurgist. His previous major work was The Steel Foundry, *published in 1914, with a second edition in 1922.*

Mr. Hall was the author of many papers presented before the American Society for Testing Materials, the American Foundrymen's Society, the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers. In 1924, he received the first Whiting Medal awarded by the AFS.

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TABLE OF CONTENTS

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2. Patterns and Molding Methods
3. Gates and Heads
4. Machine Molding
5. Flasks and Rigging
6. Centrifugal Casting
7. Shakeout, Cleaning and Welding
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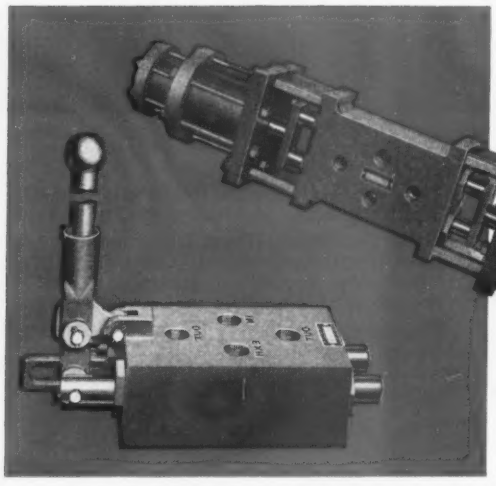

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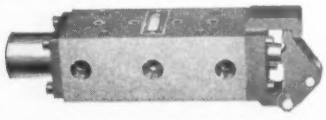

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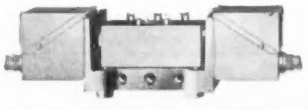

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Reduction of Plant Noise Can Increase Production

Use These Six Methods To Control the Trouble

By Ernest W. Fair

ONE SURE way to increase production in any plant operation is to make a deliberate attack on the problem of noise.

Study after study has shown that subjection to noise has several effects on workers. It decreases efficiency (of old and young alike), promotes fatigue, leads to accidents and adds to the potential for physical or mental sickness.

Coupled with the decreased productive capacity of men, machines and plant, these facts comprise an important reason for the study of noise and its elimination in a plant operation. Here are the basic factors to be kept in mind while making any such study and devising plans for elimination of noise.

Generally, the first point of attack is to discover the specific sources and causes of noises in the plant. Only when all of these have been identified and cataloged can a workable plan which will eliminate the noise be devised.

Sources of Noise — These causes usually can be traced to three sources —air-borne sounds which travel through duct-work in the plant, structural-borne sounds through building materials in contact with each other and diaphragm-transmitted sounds, which include vibration of all kinds. The latter include vibrational noise from machines and equipment, from sound waves on walls and doors and from any condition which induces vibration not only of machines, but also of materials.

Six successful methods can be employed to eliminate sources of sound or vibration which cause noises in the plant: Design changes, damping, screening, absorption, filtration and isolation by suspension.

Design Changes — Most air-borne noises can be controlled or at least lessened through design changes. In new building construction, these can be incorporated into the structure itself by the architect, but in treatment of present buildings such expensive measures hardly can be undertaken.

Such noises usually get in through doors and windows as well as through walls. Small cracks around pipes passing through a wall, poorly fitting doors, etc., can destroy an effect secured from the expenditure of sev-

eral hundred dollars on wall materials. All such sources should be located and closed or treated so that they no longer can transmit unwanted noise.

This step can be taken by erection of shields of sound-absorbent material around the noise sources. Use of double doors and windows also will accomplish a great deal. In all such planning, greater thickness is in itself never a guarantee of success. Two or more layers of material, with empty air space between, form one of the best insulators known, particularly on doors and windows. Acoustical treatment of walls, ceilings and other surfaces is used primarily to reduce noise caused by sounds originating within the room. They seldom can shield noise which originates outside.

Baffles and acoustical lining in ducts solve the problem at this point. Generally the most effective single point for lining ventilating ducts is at the inlet end. Rubber and felt gaskets can be used as seals around pipes and conduits passing through walls.

Damping — The second method, damping, is one quick and effective means of handling noise from equipment or machinery. A widely used method is to employ putty lagging with a layer of nondrying putty 1 in. or more thick, covered with varnished material or a similar solution to prevent drying. This measure is particularly effective in reducing ringing noises and high frequency whistles from machinery in the plant. Feltlike materials also are highly effective.

Screening — In a number of instances, screening the source of offending noises is the handiest and most economical method to employ. For this purpose simply construct screens or walls of noise-resistant material around the source of sound. Many of these materials are available. A local building supply dealer can make suggestions to handle each particular problem.

Absorption—The fourth step, absorption, is used where directly radiated noises cannot be screened out through such methods as the foregoing. Sound-absorbent materials are employed instead to secure the desired reduction in sound. Feltlike materials have a high sound absorbing power, as do certain porous materials.

Filtration—Filtration is particularly adapted to use with ducts, which are one of the biggest offenders in noise transmission in any plant. Acoustical filters can be secured to handle the problem in most situa-

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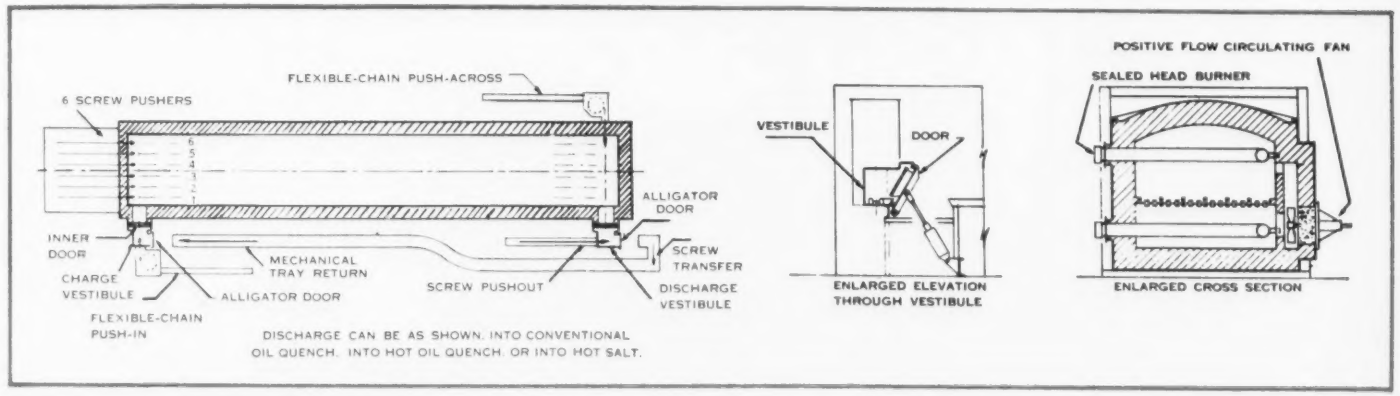

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Circle 758 on Inquiry Card—Page 255

tions. Baffles also are employed. As mentioned above, the most effective single point for lining ventilating ducts is at the inlet end. Rubber or felt gaskets around pipes and conduits, as well as around ducts passing through walls, also help to handle noise.

Suspension—The final method, isolation of the noise by suspension, sometimes is the most expensive, but it also often is the best as well as the only sure method of reducing noises caused by vibration within machinery and equipment.

The method in widest use for handling noise and vibration transmission through floors and ceilings is the use of a resilient support under the offending machines. It also has an advantage in that it isolates each machine against vibration from other machines.

On certain types of heavy machines and equipment, a combination of coil spring mountings and a concrete foundation has been found to be most effective. A mechanical, dry-friction type of damping device often is used in conjunction with spring mounting. Cork is used widely and is very effective if properly applied. On many types of machines (particularly where vibration is caused by rotation), isolation of the noise at the source is about the only effective method of handling the problem. Steel, rubber, cork and gelatin compounds also are used.

The best method of handling this problem as it applies to any particular machine or piece of equipment in an individual plant is to contact the manufacturer of the equipment for suggestions on how his specific unit may be handled best. Practically every manufacturer has worked out solutions to the problem which are far more effective than any general application. Since noise reduction at this source is never an inexpensive proposition, every source of information which can help to handle the individual problem on each unit should be investigated.

No matter how expensive it may be, however, it never is more costly than trying to continue plant operation under extremely noisy conditions, particularly when noises are in ranges which have decided ill effects on the employee.

The cost in reduced efficiency of employees, increases in accidents and added amounts of physical and mental sickness can add up to a large figure—far more than the total cost of an effective noise reduction program. Effective noise reduction never costs in any plant operation. It invariably pays a handsome profit!

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Circle 759 on Inquiry Card—Page 255

Stresses Equipment Needs in Talk to Management Group

The need for new equipment in jobbing foundries was stressed by Frank H. Reuwer, project engineer, Lester B. Knight & Associates Inc., Chicago, when he addressed the Chicago Area Management Group of the Gray Iron Founders' Society at the Graemere Hotel, Sept. 18. His topic was "Trend of New Equipment in the Foundry Industry."

Chester R. Lindgren, president, Lindgren Foundry Co., Batavia, Ill., presided at the luncheon meeting. It was announced that the next quarterly meeting will be held Nov. 20 at which time new officers will be elected.

Pointing out that industry in general has had an outstanding rate of growth since 1945, he said, foundries must have new equipment to retain their competitive position with other forms of metal fabrication. Materials handling equipment is high on the list in a foundry modernization program, for more money is spent in handling materials than any other operation. It is said that it is necessary to handle 150 tons of materials to get 1 ton of castings. Even jobbing foundries, the speaker contended, can consider spending money to save money in materials handling.

Among practices which are growing and are likely to be widely used before long are hot blast in the cupola, improved charging, the basic lined cupola, atmosphere and vacuum melting, expansion of the CO_2 process in making cores and molds, wider use of shell molding and more specialized molding machines.

But, Mr. Reuwer warned, even with good modern equipment, the foundry still will need the highest quality raw materials, and it must always have control over all operations.

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Tentative Methods of Chill Testing of Cast Iron

ASTM Designation: A 367—55T
Issued, 1953; Revised, 1955.

Scope

1. These methods of chill testing apply to gray irons which are to be free of chill in the casting and to chilled irons which are to have a specified depth of chill in the casting. Two methods of determining the chilling tendencies of cast iron are covered as follows. For many applications either method will be satisfactory if test pieces of the proper dimensions are selected.

Method A. Wedge Test—This test is generally better adapted to the higher strength gray irons. The accelerated cooling rate to induce the formation of a chill is brought about through the design of the test specimen.. This method is simpler than method B since maintenance of chill blocks or plates is not necessary.

Method B. Chill Test—This test is better adapted to the softer grades of gray iron and should be used if the casting is to have a specified depth of chill. The chill in this type of test is induced by casting one edge of the test specimen against a metal or graphite chilled plate or block.

METHOD A. WEDGE TEST

Application

2. Selection of a test specimen of appropriate dimensions will allow measurement of chilling tendencies of all gray iron compositions, with the exception of those having silicon contents much over 2.50 per cent together with carbon contents over 3.50 per cent.

Test Specimens

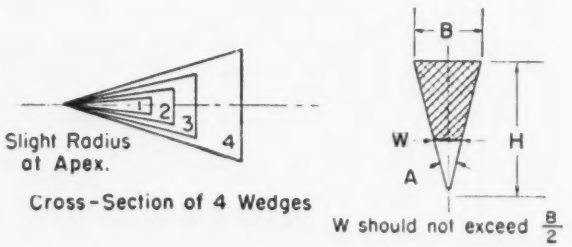
3. The patterns for the test specimens shall be made of metal to the dimensions shown in Fig. 1. With the exception of the length of the test specimen, dimensions shall not vary more than plus or minus $\frac{1}{32}$ in. The tolerance on the length of the specimen shall be plus or minus $\frac{1}{8}$-in. The radius on the apex of the wedge should be formed by filing a $\frac{1}{32}$-in. flat on the sharp edge of the metal pattern and then carefully rounding the edges formed by the $\frac{1}{32}$-in. flat and the sides of the wedge. If draft on the pattern is desired, it may be obtained by varying dimension H (Fig. 1) from one end of the specimen to the other. The pattern should be mounted in a core box so that the final core can be poured with the wedge in such a position that its length is vertical. There shall be 1-in. minimum sand at the bottom of the core.

Test Procedure

4. (a) Cores—The test shall be made in a core. The cores may be either single cores or gang cores. If a gang core is used, the minimum amount of sand between adjacent test specimens shall be not less than 2½ x B (Fig. 1). The sand cores shall be well baked and may be either resin or oil bonded. The base sand shall be of such fineness that a smooth casting will be obtained. A sand with an AFS fineness of about 70 will be found satisfactory, although a sand with a fineness of 100 or finer may be used for the smaller test specimens.

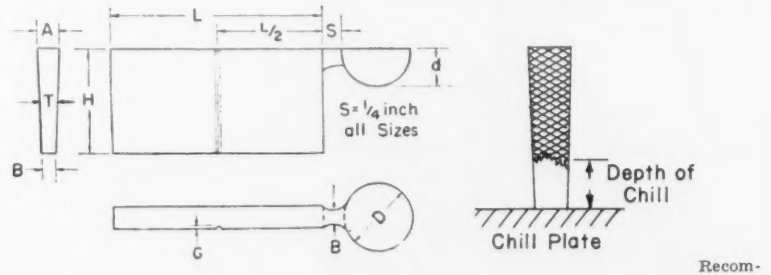
(b) Pouring Practice—The test specimens should be poured at a fairly uniform temperature. Precautions should be taken to obtain a representative sample of iron for the test specimen. Best results are obtained with a sample ladle lined with a refractory mixture which is free of graphite and chilled iron. The ladle should hold at least 5 lb of iron in order to avoid excessive chilling of the iron before the test specimen can be poured. Filling the ladle once with iron just prior to obtaining the sample for test is recommended.

(c) Cooling of Test Specimen—If time is an important factor in control applications, the test specimen may be quenched in water as soon as it is completely solid. The quenching must be done carefully to avoid cracking of the chilled apex of the wedge. This may be accomplished by grasp-



Wedge No.	Wedge Dimensions B, in.	H, in.	A, deg.	Length, in.
W 1	0.20	1.00	11.5	4
W 2	0.40	1.25	18	4
W 3	0.75	1.50	28	4
W 4	1.25	2.00	34.5	6

Fig. 1—Dimensions for test wedges for method A



Chill Test No.	Recommended Dimensions, in. T	A	B	H	L	D	d	G	Recommended Chill Depth Range, 1/32 in. [a]
1C	3/16	1/4	1/4	1 1/4	2 1/2	3/4	1/2	1/32	3 to 12
2C	1/4	5/16	3/8	1 1/2	3	7/8	1/2	1/32	4 to 16
3C	3/8	7/16	7/16	1 3/4	3 1/2	7/8	1/2	1/16	6 to 24
4C	1/2	5/8	1/2	2	4	1	5/8	1/16	8 to 32
5C	3/4	1	1	2 1/2	5	1	5/8	1/32	12 to 48

[a] T/2 to 2T.

NOTE 1.—Casting to be made in a dry sand core.
NOTE 2.—Allow ¾ in. of sand on all sides.

Fig. 2—Recommended dimensions for method B chill test specimen

FOUNDRY Data Sheet

ing the wedge with tongs at the apex of the wedge and immersing about ¼ to ½-in. of the base of the wedge in water. The wedge may then be gradually quenched but should be removed while there is still sufficient heat in the wedge to dry off the water. If speed of testing is not important, the test specimen may be either cooled in the core or in the air. If cooled to a very dull red before quenching in water, the demarcation between the chilled iron and the gray iron is somewhat clearer than if the test specimen is quenched as soon as it is solid.

5. The test specimen shall be broken by striking with a hammer in such a manner that the fracture is straight and midway of its length. The chilled iron at the apex of the wedge with few exceptions consists of two zones. That portion nearest the apex entirely free of any gray spots is designated as clear chill. That portion starting with the end of the clear chill and continuing to the location where the last spot of cementite or white iron is visible is designated as the mottled zone. The extent of the mottled zone may vary from virtually nothing to an amount equal to and even greater than the amount of the clear chill. If the wedge is measured at the junction of the gray fracture with the first appearance of chilled iron, the measurement shall be designated as total chill. In all cases, the chill shall be expressed in 1/32 in. as measured across the wedge at the locations just described. The location of this measurement for a wedge having a narrow mottled zone is shown in Fig. 1. For structure control purposes, it is generally satisfactory to measure the wedge where the structure is approximately 50 per cent white iron and 50 per cent gray iron. This value will be found to be virtually the same as the average of the measurement of the clear chill and the total chill. In reporting the chill measurement, the size of the test specimen shall be designated. A chill reported as W3-12 would indicate that wedge W3 was used and the width at the junction of the chilled and gray portion of the fraction was 12/32 in.

METHOD B. CHILL TEST

Application

6. This method is better adapted than method A to irons having silicon contents of 2.50 per cent and over and carbon contents of 3.50 per cent and over. It is also useful for control purposes in high production foundries making irons somewhat lower in carbon and silicon than indicated above. This method is also preferable for applications in which the casting is to have a specified depth of chill.

Test Specimens

7. The patterns shall be made of metal and conform to the dimensions shown in Fig. 2. All dimensions shall be within plus or minus $\frac{1}{32}$-in. of those shown, with the exception of the length which may vary plus or minus ⅛ in. The test specimens shown are designated to be cast in the position shown. This design is the preferred one although for high production work a gang core box and pattern may be used. In this case a test specimen with the chilled face in a vertical position may be found more convenient although it is not considered as satisfactory as the horizontally cast test specimen.

Test Procedure

8. (a) Cores—The test shall be made in a core. For general application, a single core is considered more satisfactory than a gang core. If a gang core is used, the amount of sand between test specimens shall be 1 in. minimum or 2½ x A (Fig. 2), which ever is greater. The remarks concerning cores in Section 4(a) apply here also.

(b) Chill Plates—Chill plates may be cast iron, steel, copper, or graphite. The surface of the chill plate shall be machined. When single test specimens are cast, the chill plate shall extend at least 1 in. beyond the test specimens in all directions and shall be at least 1-in. thick. For high production work, a sufficient number of chill plates must be available to keep the temperature of the plate below 500 F. A water-cooled steel plate will be found more satisfactory for high production work. A water-cooled plate having a reservoir is preferable to one having circulating water. In the latter case the plate may become too cold, resulting in condensation of moisture on the plate. The chill plate must be kept free of fire cracks and all foreign matter as the depth of chill is markedly affected by the presence of films of burned oil or other accumulations. The best practice is to clean off the plate with a wire brush as soon as the core and test specimen is removed.

(c) Pouring Practice — Remarks on pouring practice in Section 4(b) apply here. In addition, iron shall not be poured directly on the chill plate as the depth of chill may be affected or the test specimen may burn on the chill plate. It may be desirable to place a weight on the core when pouring it as there may be a tendency for the core to lift as it is being poured. The opening in the core shall be free of sand fins and shall set flat on the chill plate. In the event the core does not fit the chill plate, it shall be rubbed until it does.

(d) Cooling of Test Piece—The remarks in Section 4(e) apply here. If rapid testing is desired, the chill test specimen may be quenched in water, starting with the edge farthest from the chilled edge.

Measurement of Chill

9. The test specimen shall be broken in such a manner that the fracture is straight and follows the notch in the test specimen. The chill from the chilled face to the appearance of a gray spot shall be designated as clear chill. The distance from the chilled face to the last appearance of a spot of white iron shall be designated as total chill. That portion of the chill-affected zone between the clear chill and the total chill shall be designated as the mottled zone. As in Section 5, it will be found satisfactory for general structure and quality control purposes to measure chill from the chilled face to a location where the structure is approximately 50 per cent white iron which is roughly half-way through the mottled zone. If the chill test is used for the control of iron for castings having a chilled surface for wear resistant purposes, it would be desirable to measure and record clear chill. If the casting with a chilled surface is to have some machining operation in the proximity of the chilled surface, it may also be necessary to specify the maximum depth of total chill as well as depth of clear chill. In all cases, the dept of chill shall be expressed in 1/32 in. and the size of the test specimen used shall be designated. For example, a measurement recorded as 4C-12 indicates that test specimen design 4C was used and the depth of chill was 12/32 in.

Additional copies of this specification may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, for a nominal sum.

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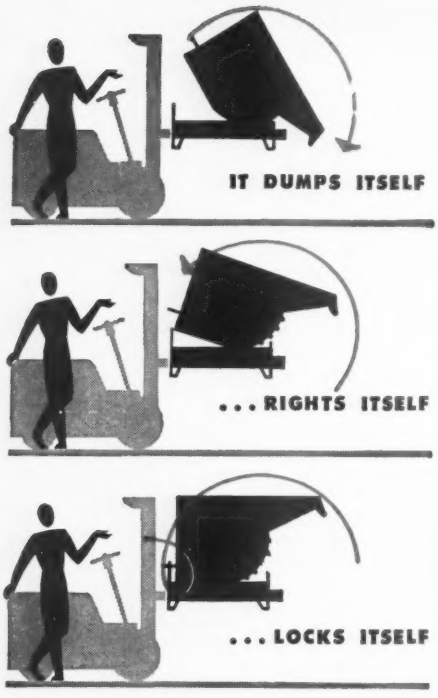

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Industrial Lung Diseases Require Hygiene Measures

Silicosis and Siderosis Are Not Same Disease

By W. Schweisheimer, M.D.

INDUSTRIAL hygiene has become a matter of increasing concern to American business. Lung diseases in particular have received considerable attention, and it behooves management to have some knowledge of the nature, causes and prevention of these conditions.

Three terms commonly heard in modern industrial hygiene are pneumoconiosis, silicosis and siderosis. Let us examine each.

Pneumoconiosis is a general term applied to all dust affections, or diseases, of the lungs. In a more restricted sense, it refers to changes in the lungs induced by inhaled mineral dust.

Silicosis is a lung disease due to breathing air containing silica (SiO_2), combined with shortness of breath. It occurs among workers in such fields as mines, quarries, ceramics, tunnel construction, sand blasting and foundries.

Siderosis is the result of a deposition of iron dust in the lung tissues. Anthracosis is a similar condition induced by deposition of coal dust in the lungs.

Siderosis Is Mild Affection—Siderosis is a mild (benign) form of pneumoconiosis. It does not incapacitate, according to Gafafer's *Manual of Industrial Hygiene,* and such cases never should be diagnosed as silicosis.

In a recent study on the consequences of inhalation of iron dust, Drs. L. E. Hamlin and H. J. Weber emphasized the necessity of making a careful differentiation between silicosis and siderosis, something difficult to do from chest x-ray pictures alone. The amounts of silica and iron in the dust to which workers are exposed must be considered, as well as the duration of their exposure. The authors made their study on foundry cleaning room employees, about 27 per cent of whom had abnormal chest x-ray pictures. The abnormality usually was contracted within ten years. After definite shadows in the lungs had appeared, no progression occurred in any case.

Drs. Hamlin and Weber pointed out that these factors favor the diagnosis of siderosis rather than that of silicosis: 1. Early onset of shadows in the x-ray pictures. 2. Lack of progression of the shadows. 3. Development of a kind of tuberculosis infection in some cases, without later

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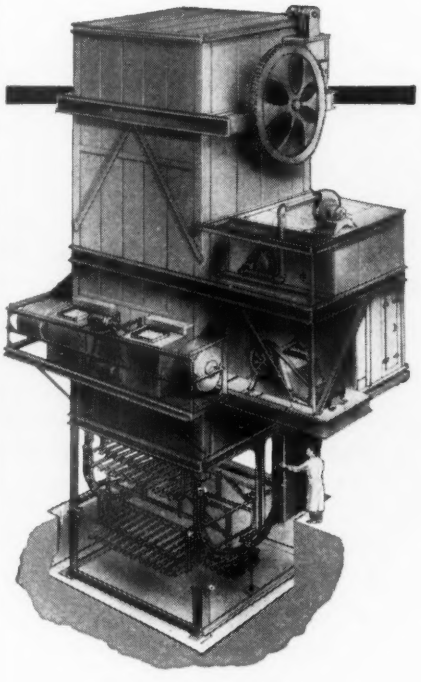

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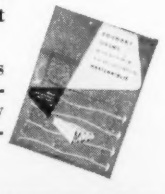

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progression. 4. Lack of clinical symptoms (the workers did not feel sick). 5. The analysis of the inhaled air in the cleaning rooms.

Controlling Metal Inhalation—Effective enclosure and exhaust are the principal control measures for all metal particles which pollute the air. The enclosure must be such that the exhaust maintains an air flow over the source of the polluting material and away from the machine operator. Dr. G. W. Daubenspeck and his co-investigators have stated that the better the enclosure, the smaller the amount of exhausted air required to provide effective protection. They also emphasize the need for scrupulous housekeeping. Materials must be handled so that there is as little spillage and dispersal of dust into the air as possible.

Heated surfaces—whether masses of hot material or furnaces under temperature—cause definite movement of air vertically. The American Foundrymen's Society has issued a code of practice which says that exhaust systems should be installed to exhaust all heated surfaces causing a poisonous or irritating concentration of matter in the plant atmosphere. Removal of excessive heat and nonpoisonous fumes and gases can be accomplished by general ventilation or natural-draft hoods or stacks.

Metal-Fume Fever—The directional tendencies of gases and fumes should be studied carefully, and hoods should be designed to receive all such matter. The minimum volume of air to be exhausted should not be less than 12 times the volume of gases and fumes emitted from the equipment. This point is the more important because it is essential for control of metal-fume fever, one of the oldest known industrial diseases. It is characterized by a fever reaction after the inhalation of finely divided particles of metallic oxides. Popular names of the condition include brass founder's ague, metal ague, brass chills, zinc chills, spelter (zinc) shakes and others.

Metal fumes which produce the condition most commonly are encountered in industries in which a metal such as zinc is heated in an oxidizing atmosphere to a temperature near its boiling point—for example, in brass founding and the oxyacetylene welding of galvanized iron. Fumes result from the fusing of manganese in the manufacture of steel, from cadmium in zinc works or during the melting of cadmium ingots, from smelting and electrolytic recovery of zinc, etc. The patient usually recovers within a relatively short time, rarely more than one or two weeks.

Silicosis in Foundries—A recent discussion in the *Journal* of the American Medical Association considered whether it is reasonably safe for a molder with second-stage silicosis to continue working in a foundry which now uses a parting sand free from silica. The company claimed indirectly that the silicosis was no more apt to progress under such conditions than if the worker should be removed from the foundry entirely.

The *Journal,* through its expert, stated that advice to workmen affected with silicosis about continuing work in their former occupations is governed by their age, the local conditions in the plants and employment policies. From a strictly medical point of view, men over 45 who have developed silicosis slowly over a period of 20 or more years of exposure can return to work in a clean foundry without any appreciable danger.

Younger men, the *Journal* says, and particularly those who have developed their silicosis within a period of five or six years, probably are unusually susceptible to dust and should be removed to some other job. The legal aspects of the problem may necessitate removal from any further

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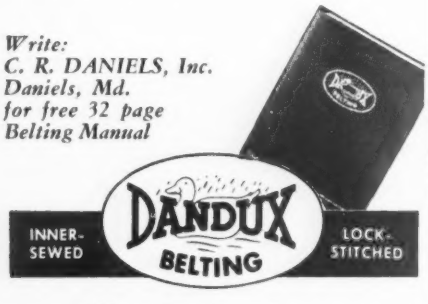

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exposure of all people affected with silicosis, regardless of its severity. Compensation officials may hold that exposures, however slight, are dangerous if silicosis is present. It said, "To permit the silicotic to work who is perfectly able to do so may create financial liabilities which the employer is unwilling to accept."

Improving Fire Resistance Of Foundry Bottom Boards

Texas Survey Shows How Greatest Damage Occurs

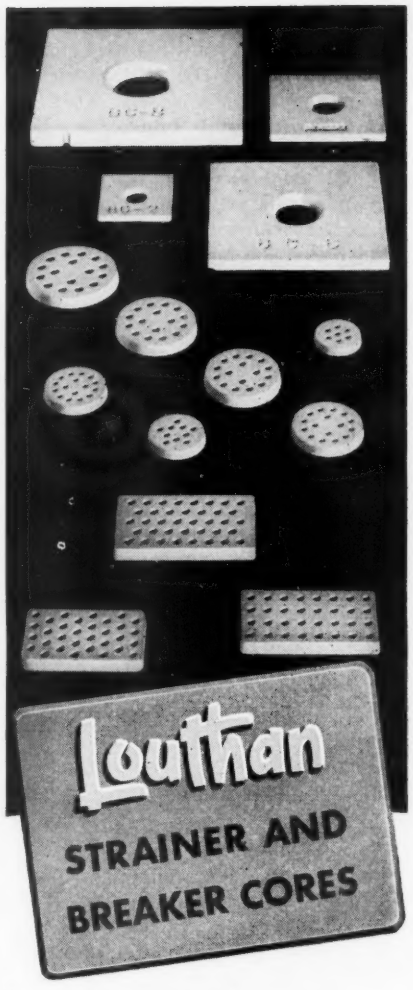
RESULTS of a co-operative project designed to increase the fire resistance of wooden bottom boards have been published by the Texas Forest Service. The study covers half a year of investigative work. It was performed by personnel of the Forest Products Department, Texas Forest Service, under foundry operating conditions at Texas Foundries Inc., Lufkin, Tex.

Operations at Texas Foundries depend on the use of wooden bottom boards and means have been sought to increase the life of these boards. The severe heat conditions imposed by molten metal ordinarily result in rapid deterioration of the boards and in consequently high replacement costs. Several methods of improving their fire resistance were attempted. These experiments and their results, including cost data, are discussed in some detail in the report.

The report also describes the use of bottom boards made of various types of wood to determine the one capable of rendering the greatest service at the least cost. A number of test boards were treated with various fire-retardant formulations such as inorganic salts, impregnated by both pressure and nonpressure methods, and with several intumescent coatings, including oil-base and resin-base paints.

Improvements in construction were undertaken after an analysis of the functional weaknesses of the customary board. The normal bottom board, made of two nailed thicknesses of either 1½ or 2-in. lumber, regularly showed evidence of charring around the nails and along the open lumber joints. Large knots were also found to be focal points for deterioration. To overcome these objections, various types of glue-laminated boards were investigated.

A comparatively new wood ma-



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Louthan Refractory Strainer Cores will not chip, spall or erode, even at temperatures as high as 3,000° F. Dimensionally accurate, they give you uniform casting rates. They keep slag and core-sand inclusions out of castings—save you needless grinding and rejects. Try them! Complete range of standard sizes. Special sizes to order.

Louthan Refractory Breaker Core Shapes generate no core gas when exposed to heat of molten metal. They are smooth, strong, resist breakage. Try them! Complete range of standard sizes. Special sizes to order.

WRITE TODAY FOR *FREE* CORE PRINTS!

Test Louthan Strainer Cores in your own plant—prove to yourself that they save money, help produce better castings. We'll be happy to send you FREE core prints for your patterns, also a test-quantity of strainer cores. Simply tell us your sprue diameter (or in-gate size). Why not write us today?

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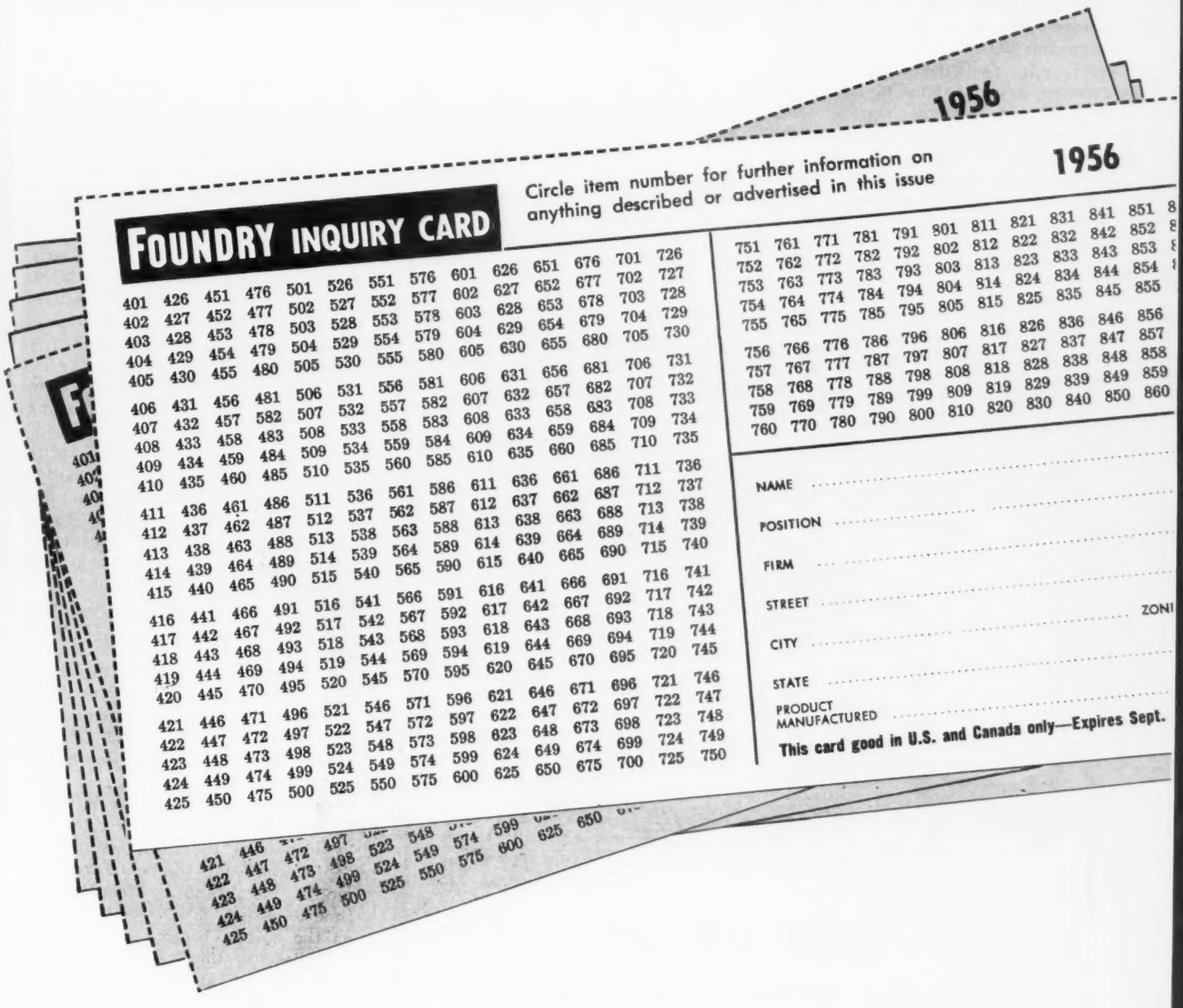

MORE FOUNDRYMEN are using these handy inquiry cards - - - - to get more information and literature on equipment, products and services described or advertised in FOUNDRY.

For your convenience - - - - Inquiry Cards will be found in this issue on page 255.

FOUNDRY

terial, one which showed considerable promise, is particle board. This material, produced from wood particles compressed with synthetic resins, is hard and withstands heat deterioration under prolonged and continued foundry use. A series of 19 x 19 x 1½-in. test bottom boards, commercially made of southern yellow pine particle board, was used repeatedly in the preparation of a minimum of 25 castings. They showed very little or no signs of deterioration.

The report includes photographs of various types of board construction and methods of treatment before and after foundry use. Principal factors affecting the life of bottom boards are discussed and a list of recommendations is included, as follows:

1. Additional study of particle board material for bottom board construction is desirable.

2. Fire resistance can be improved by coating the edges and obverse face of boards with a high-silica ratio water glass.

3. The preparation of bottom boards with open joints, checks or splits should not be permitted.

4. Nails should not be used in board construction. If they cannot be avoided, the minimum number necessary for proper strength requirements should be employed. Further, such nails should be distributed so that they are not concentrated in any area—particularly in the board center.

5. Boards should be dated on their first use so that an accurate service record can be maintained and defects noted for correction.

6. Rough handling, particularly throwing of boards on hard surfaces, should be reduced through educational supervision.

7. Increasing pourer efficiency reduces damage from overflows.

8. Castings should be removed from bottom boards as soon after pouring as possible.

9. The use of molding sand as insulation against the heat of molten metal probably offers the simplest and most effective means of board protection. A minimum compressed thickness of 3 in. of molding sand between casting and bottom board surface is recommended for all molds of equivalent size to those normally supported by 19 x 19-in. boards.

An interesting feature of the report is a graph which shows the effective heat developed at the upper surface of the bottom board under conditions of varying sand depth and under different exposure times. The chart graphically suggests the feasibility of reducing board deterioration by increasing the thickness of sand depth separating the board from the molten metal and by reducing the time a casting is allowed to remain on the bottom board.

Copies of this report, Research Note No. 16, are available without cost to all industries within Texas. Requests should be made to the Forest Products Department, P. O. Box 460, Lufkin, Tex. The publication is available to industries outside Texas from the Texas Forest Service, College Station, Tex., at 30 cents per copy.

Want core plates that SAVE MONEY?

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You get real long term economy with Transite* Core Plates. Their initial cost is low . . . and their maintenance cost negligible. Transite Core Plates are tough and corrosion-resistant. They are made from an asbestos and cement composition by a special Johns-Manville process. They resist shock and corrosion . . . will not crack or break easily.

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Transite Core Plates are easily handled. They're simple to clean, too, since core wash, sand, etc. do not adhere to them as readily as to other core plate materials.

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Foundrymen who have used Transite Core Plates for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 14, New York 16, New York.

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Moves to New Building

Dust Suppression & Engineering Co. has moved its administration offices, engineering department and testing laboratory to a new building at 120 South Broadway, Lake Orion, Mich.

The firm's engineering staff has been joined by Elbridge M. Smith, who has had ten years of experience in dust control work and will be assistant chief engineer.

Steel Founders List Program For 1956 T&O Conference

The eleventh annual Technical and Operating Conference of the Steel Founders' Society of America will be held in Cleveland on Nov. 7-9.

Technical subjects on the conference agenda include sessions on molding operations and bentonite, the economic importance of recently developed foundry processes, metal and sand problems and inspection as related to quality. Another session is scheduled on steel casting requirements for various applications and has been planned to be of interest to both technical and operating personnel and sales engineers of the steel castings industry.

Harry A. Stuhldreher, assistant to the vice president, United States Steel Corp., who is well known as the All-American quarterback of the Four Horsemen of Notre Dame in 1924, will speak on "The Safety Position" at the luncheon meeting on Nov. 7. Speaker at the luncheon on Nov. 8 will be Edward A. McFaul, Chicago, whose subject will be "How To Keep Your Foot out of Your Mouth."

Report Covers Extinguishing Of Magnesium Fires

Chlorobromomethane combined with a 50-per-cent solution of the liquids di-isodecyl phthalate or ethanol proved the most effective agents tested for the Air Force for extinguishing magnesium fires, according to a 149-page report of research recently released to industry through the Office of Technical Services, U. S. Department of Commerce.

This report is PB 121375, entitled *A Study of Magnesium Fire Extinguishing Agents.* It may be ordered from OTS, U. S. Department of Commerce, Washington 25, D. C., for $3.75 per copy.

Offers Fire Insurance Data

A brief explanation of the difference between the various kinds of fire insurance companies and other general phases of the business of property insurance is available from Western Underwriters Association, 175 West Jackson Blvd., Chicago 4, Ill.

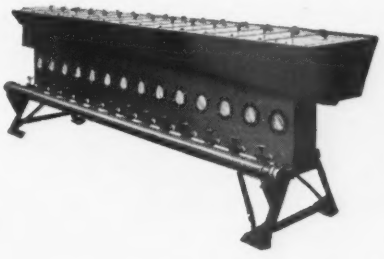
The booklet is entitled "What's the Difference" and provides answers to such questions as these: What is the difference between a capital stock insurance company and a mutual insurance company? What is a reciprocal exchange? What is an independent local agent? Is self-insurance a form of insurance? Why do some companies charge less than others?

National Safety Council Can Supply Accident Yearbook

The 1956 edition of *Accident Facts,* the National Safety Council's statistical yearbook, now is available. It contains facts and figures on all types of accidents. Twenty pages of the 96-page book are devoted exclusively to occupational accidents and provide the factual background necessary to give direction to an industrial safety program.

This material includes a detailed list of accident rates by major industry groups as well as charts showing the accident trend during the last 30 years.

Accident Facts is priced at $1 a single copy and less for quantities. Inquiries should be sent to the National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.



Clean and Resize Your Foundry Sands this Economical Way

The CONCENCO® CPC Hydraulic Classifier is ideal for cleaning and resizing foundry sands. Sand is classified into as many sizes as there are cells in the classifier . . . and is then recombined to make a completely satisfactory foundry sand. Extremely fine or burned particles are removed as a slime overflow.

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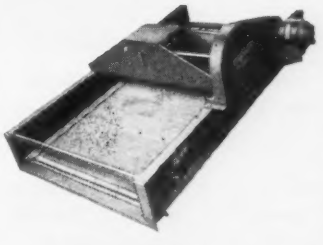

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The Shakeout

Use Proper Hoses for Sand and Shot Cleaning

FOUNDRIES, metal finishing plants and others using blast cleaning or shot peening should select hose with particular care according to engineers of Thermoid Co., Trenton, N. J. When sand is used for cleaning metal or other surfaces, the prime enemy of hose is abrasion. The tube should be composed of pure gum rubber so that sand particles bounce off. A static wire will control static electricity.

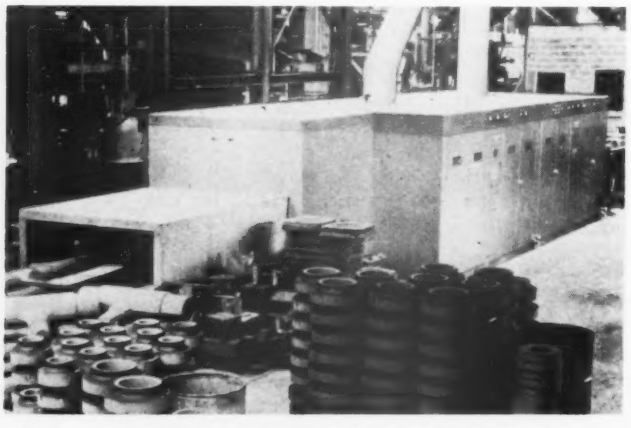
When metal shot is used, the greatest hose destroyer is the static electricity. If not controlled, the electricity generates high-voltage potentials which burn through tube and wall. The tube therefore must be compounded to conduct and dissipate electricity.

When both sand blast and shot blast or shot peening are used in the same shop, the hose should, of course, not be interchanged.

For More Details Circle No. 477—Page 255

Dielectric Oven Bakes 8000 lb of Cores Hourly

MORE THAN 8000 lb of urea-bonded cores are reported to have been baked per hour on this new Coleman dielectric core oven at Alabama Pipe Co., Anniston, Ala. Said to be the largest dielectric core oven in operation in a foundry, the unit has a nominal power output rating of



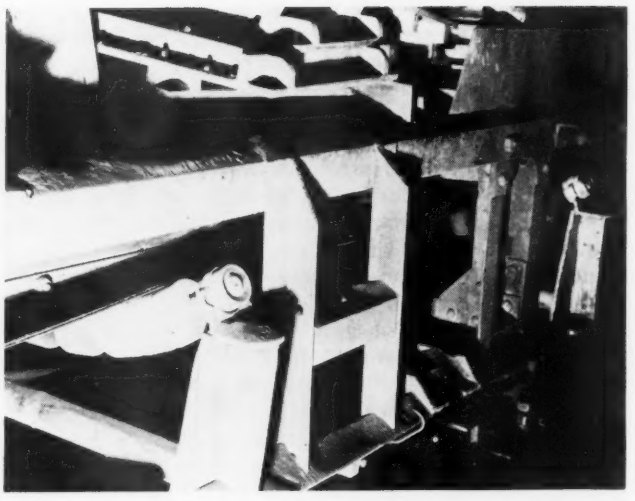
150 kw. It bakes a minimum of one 140-lb cross core per minute, keeping pace with a coreblower which feeds onto its conveyor. Total time on the conveyor is 11 minutes.

The oven soon will be operated with a completely automatic coreblower which will index the coreplate, blow the core and eject it onto the oven conveyor.

For More Details Circle No. 478—Page 255

New Idlers End Conveyor Belt Stoppages

TWO YEARS ago, a conveyor system for carrying spillover sand away from the molding line in the foundry at the South Bend, Ind., plant of Bendix Aviation Corp. was a perpetual headache. Idlers froze up and tore the belt or, even if they were caught fast enough, required that the line be shut down for half a day to install each replacement. Then a new type of idler, developed and produced by Joy Mfg. Co., Pittsburgh, was installed. Since then, no idler has had to be replaced, and no belts have torn, it is reported. In addition, inspection



and lubrication tours have been discontinued because they no longer are necessary.

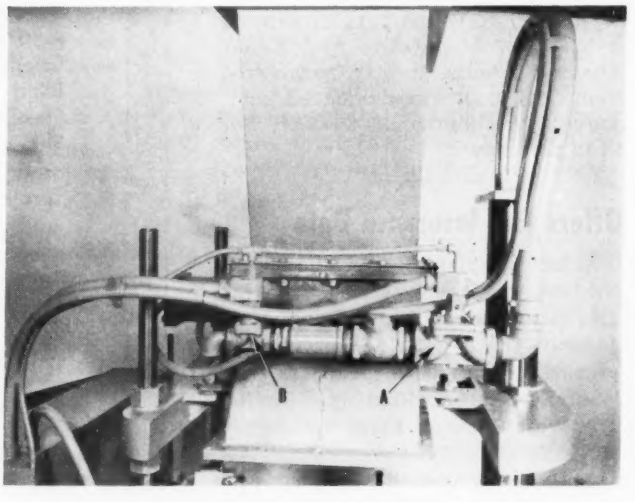
The new idler is a neoprene or rubber-covered wire rope with swaged steel shank ends which fit into the inner race of sealed, double-row, precision ball bearings. Each roll forms its own trough, turns on its own axis and provides simple, efficient support for the conveyor.

For More Details Circle No. 479—Page 255

Solenoid Valves Aid Shell Machine Operation

SOLENOID VALVES manufactured by Automatic Switch Co., Orange, N. J., are key components in a new automatic shell machine made by C & S Products Co., Detroit, Mich. The machine is used for high-speed production of shell cores and molds.

A 1½-in. valve (A) is the main supply air inlet valve. When it is energized, air is supplied to force a predetermined amount of sand to form the shell. The ¾-in. valve (B) exhausts the air left in the system after the



1½-in. valve has closed. Construction of the valves is such that they are especially suited for absolutely tight shutoff control. Stray sand particles can not affect valve operation, it is claimed.

For More Details Circle No. 480—Page 255

Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.

ORWELL, OHIO • U. S. A.

SALES • SERVICE • STOCK • COAST TO COAST

Circle 770 on Inquiry Card—Page 255

STATEMENT OF OWNERSHIP

Statement required by the Act of August 24, 1912, as amended by the Acts of March 3 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of FOUNDRY, published monthly, at Cleveland, Ohio, for October 1, 1956. 1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Penton Publishing Company, 1213 West Third St., Cleveland 13, Ohio. Editor, Frank G. Steinebach, 1213 West Third St., Cleveland 13, Ohio. Managing editor, William G. Gude, 1213 West Third St., Cleveland 13, Ohio. Business manager, George A. Pope, 1213 West Third St., Cleveland 13, Ohio. 2. The owner is The Penton Publishing Company, 1213 West Third St., Cleveland 13, Ohio. Names and addresses of stockholders owning or holding 1 percent or more of total amount of stock: Edwin C. Barringer, Washington, D. C.; Mrs. Penelope S. Beatty, Shaker Heights, Ohio; Conbat Co., Santa Barbara, Calif.; Cornom & Co., Cleveland, Ohio; J. R. Dawley, Cleveland, Ohio; Mrs. Agnes T. Hays, Cleveland, Ohio; George O. Hays, Cleveland, Ohio; Russell C. Jaenke, Cleveland, Ohio; A. L. Klingeman, Cleveland, Ohio; John D. Knox, Cleveland, Ohio; Parness & Co., Cleveland, Ohio; J. D. Pease, Sr., Mount Dora, Florida; Francis O. Rice, Cleveland, Ohio; Margaret L. Shaner, Cleveland, Ohio; Charles J. Stark, Cleveland, Ohio; Penelope M. Stark, Cleveland, Ohio; Wean Engineering Co., Inc., Warren, Ohio; Mrs. Leona F. Weber, Pittsburgh, Pa.; Grace Whelan, Santa Barbara, California. 3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are New England Mutual Life Insurance Co., 501 Boylston Street, Boston 17, Mass. 4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner. Frank G. Steinebach, Editor. Sworn to and subscribed before me this 28th day of September, 1956. (Seal) Joseph P. Lipka, Notary Public. (My commission expires September 9, 1958)

TAM* ZIRCONITE* FOUNDRY PRODUCTS

Give you the most for your money!

The finer grain of Zirconite* products offers cost-saving advantages in steel, iron, bronze, aluminum or magnesium foundry operations.

ZIRCONITE* PASTE WASH

Does not fuse with molten metal. Resists metal wetting. Prevents metal penetration. Produces smooth casting surfaces.

ZIRCONITE* FLOUR

Used as a filler in cores. Lowers permeability. Increases refractoriness.

ZIRCONITE* SAND

Eliminates the problems of burning-in and penetration. An excellent means of chilling heavy sections to promote directional solidification and to eliminate heavy risers.

Put the money-saving advantages of TAM* ZIRCONITE* products to work in your operation. Write our New York office for detailed information. Discuss them with our field engineers.

*Registered Trademarks

TAM PRODUCTS

Registered U. S. Pat. Off.

TITANIUM ALLOY MFG. DIVISION

NATIONAL LEAD COMPANY

Executive and Sales Offices:
111 Broadway, New York City

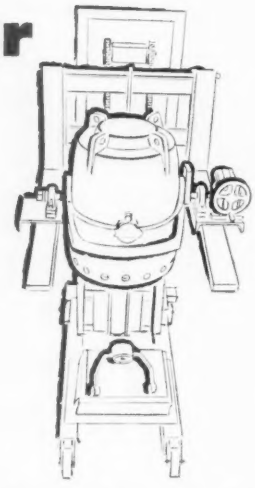
General Offices, Works and Research Laboratories:
Niagara Falls, New York

Circle 771 on Inquiry Card—Page 255

THE KEL-RAY® Projector

Radiographic

TOOL



Portable • Safe • Economical • Easy to Use

Here is a versatile tool that "looks through" metal and allows you to see on film the internal structure of castings, welds or fabricated assemblies before you OK them for service. Such pre-service testing lowers future replacement costs, safeguards against service failures, helps to establish and maintain quality standards that invite more business, and offers an economical method of examining metal structures inaccessible to many types of equipment.

KEL-RAY Projectors employ radioactive cobalt, iridium, or cesium as a source of gamma rays. Built in three portable sizes, the smallest of which can be moved by hand, each is suited to specific applications depending on the source used and the radiation pattern required. Designed to withstand rough handling, Kel-Ray Projectors are safe, economical to own and operate, simple to use for anyone properly trained.

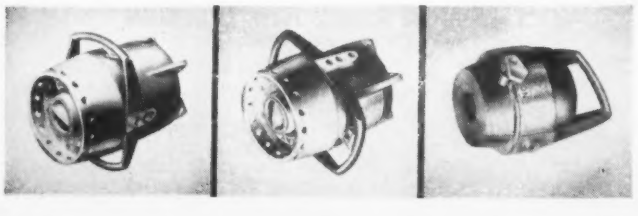
KEL-RAY Projectors can keep an economical eye on the castings, welds, or assemblies on which *your* future business depends.

• *For information, please write.*

METAL & THERMIT CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

WELDING SUPPLIES • RADIOGRAPHIC EQUIPMENT • PLATING MATERIALS • ORGANIC COATINGS
CERAMIC MATERIALS • TIN & TIN CHEMICALS • METALS & ALLOYS • HEAVY MELTING SCRAP



296

Circle 772 on Inquiry Card—Page 255

Many foundries save money many ways with CERRO ALLOYS

Cerro Alloys, that versatile group of low-temperature-melting alloys, cut costs in production and maintenance of patterns and core boxes. In duplicating master patterns, anchoring patterns in matchplates, producing patterns compensated for shrinkage, metallizing wood patterns and core boxes, altering or repairing matchplates, and many other tasks, Cerro Alloys are unsurpassed for economy and efficiency. Bulletin F6 contains full information. Send for it.

CERRO DE PASCO CORPORATION

318 Park Avenue, New York 22, N. Y.

Circle 773 on Inquiry Card—Page 255

KEEP WORK AREAS WARM ... improve worker efficiency!

Low cost all-purpose heater for shops, foundries and semi-open areas

Easily Portable.. HOT & CLEAN!

HY-LO Portable Heaters are the answer for permanent or temporary heat. Ideal for hard-to-heat areas—temporary heat in emergencies—any standby or supplementary heating!

WHY HY-LO IS BEST

- Low 1st cost low operating cost.
- 70,000 to 140,000 BTU per hour!
- Burns only ½ to 1 gal. per hr. of low cost fuel oil.
- One filling lasts 10 to 20 hours.
- Exclusive damper for quick extinguishing.
- Carrying handles for easy moving.

Nationally accepted! Produces more heat per dollar invested than any other heater! Write or wire for nearest dealer.

DISTRIBUTORS IN ALL PRINCIPAL CITIES

Scheu PRODUCTS CO.

275 Stowell St., Upland, Calif.

Circle 774 on Inquiry Card—Page 255

Imported from Germany, specifically designed to cut filing and grinding costs . . .

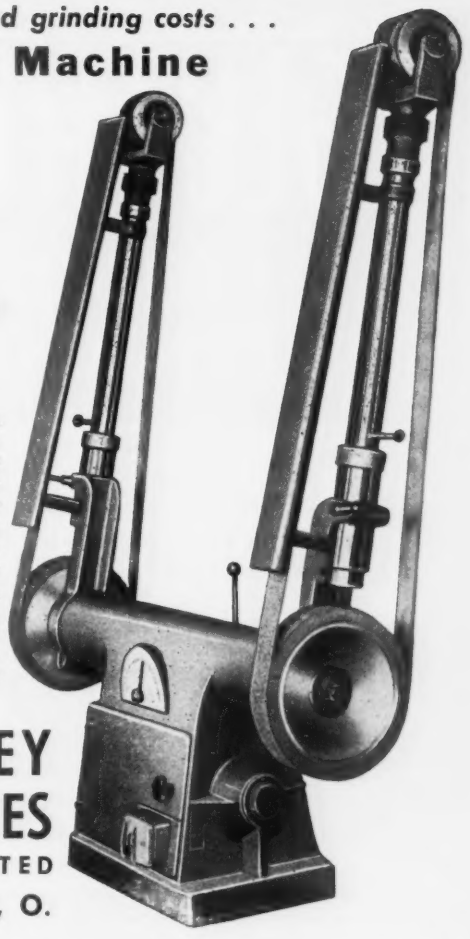
Filing Machine and Band Grinding Machine

featuring

INFINITELY VARIABLE SPEED TRANSMISSION

★

The filing machine at left is an efficient and economical tool for roughing and smoothing any type of casting, iron, steel, or nonferrous. The band grinding machine at right grinds and polishes by means of contact discs and grinding bands. Both machines have infinitely variable speed transmission. This is an import deal. Ask us about it.



HINCKLEY INDUSTRIES
INCORPORATED
BOX 241 BRUNSWICK, O.

Circle 775 on Inquiry Card—Page 255

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

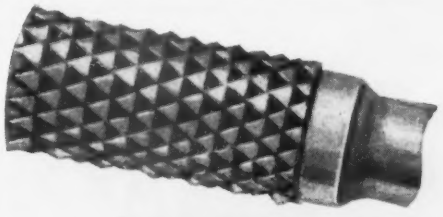
You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.
Manufacturers of Pneumatic Tools Since 1903
DAYTON, OHIO

Circle 776 on Inquiry Card—Page 255



CARBIDE

SOLID and TIPPED CUTTING TOOLS

Stock Tools:

Burrs—Carbide • Drills—Solid Carbide and Tipped • Internal Grinding Burrs—Solid Carbide • Reamers and End Mills—Solid Carbide and Tipped • Slitting Saws—Solid Carbide • Rotary Files H.S.S.—Hand cut and ground from the Solid

Specials:

In addition to the foregoing, ESSEX maintains a special tool designing department and can supply the following in Solid Carbide and Carbide-Tipped Tools:
Tipped Tools • Counterbores • Step-Drills • Twist-Drills • Dies • Grooving and Milling Cutters • Key Cutters • T-Slot Cutters • Router • Bits • Profiling Cutters, Etc. to sketch or blueprint.

Complete resharpening and reconditioning, service available.

Areas available for distributors inquiries invited.

Makers of Fine Tools Since 1868

ESSEX ROTARY FILE & TOOL CORPORATION
295 MADISON AVE. • NEW YORK 17, N. Y.

Circle 777 on Inquiry Card—Page 255

GLUTRIN
LIQUID BINDER

GOULAC
DRY BINDER

For
CORE WORK, SAND FACINGS, SPRAYS

Write for pamphlets giving detailed information. Both materials carried in stock by America's foremost foundry jobbers

Robeson Process Company
(Established 1905)

American Gum Products Co.
(Established 1915)

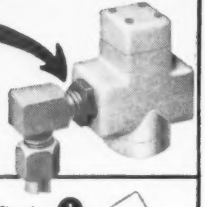
GENERAL OFFICES AND PLANT: • ERIE, PA.

Circle 778 on Inquiry Card—Page 255

TRU-O-SEAL
TEFLON SEAL

PAT. PENDING

STOPS PIPE THREAD LEAKS instantly!

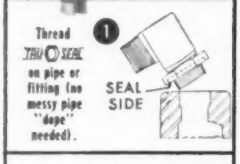


Prevents future leaks!

TRU-O-SEAL does away with messy pipe "dope" compounds, eliminates damage caused by overtightening of conventional leaky joints, and is immune to ALL known hydraulic fluids and to steam, air, water, solvents, and practically all gases and chemicals. It withstands temperatures from —100° F. to plus 500° F., saves cost and labor of special or welded fittings, and has been fully field tested and proven by leading manufacturers. Comes in ⅛" to 2½" pipe thread sizes.

Write for data and prices

TRU-O-SEAL DIVISION
Flick Reedy Corporation
2034 N. Hawthorne Melrose Park, Ill.
"Miller Fluid Power" is also a Div. of Flick-Reedy Corp.


1
Thread TRU-O-SEAL on pipe or fitting (no messy pipe "dope" needed).
SEAL SIDE
2
Thread pipe or fitting 4 threads into port. Point in desired direction.
3
Tighten TRU-O-SEAL to complete leakproof assembly (only light torque required).

RINGLIFT SAND CONDITIONER

"The Ringlift has helped us more than any other piece of equipment we have ever purchased", says General Manager of this leading Midwestern gray iron jobbing foundry.

After More Than 500,000 Tons

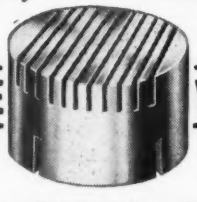
This hot, hard, lumpy sand is prepared, cooled and tempered by the Ringlift without prior addition of water. Sand is mixed, blended, screened, magnetically separated, triple aerated. You, too, can save by preparing your sand properly, right on the floor where it will be used. Investigate Ringlift today.

STATES ENGINEERING CORPORATION
922 W. BERRY STREET, FORT WAYNE, INDIANA

Circle 780 on Inquiry Card—Page 255

BE PREPARED TO HAVE
BETTER CORES
By Inserting

SMILLIE



VENTS

FOR BLOWING CORES
Sizes from ⅛" to 1" in ⅛" steps Samples upon request

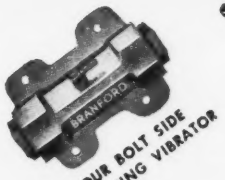
C. M. SMILLIE & CO.
1124 Woodward Heights Ferndale 20, Mich.

Circle 781 on Inquiry Card—Page 255

Circle 779 on Inquiry Card—Page 255

The Trademark of Quality Products

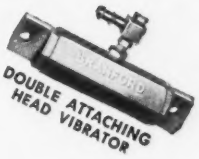
Since 1915



FOUR BOLT SIDE MOUNTING VIBRATOR

HOSE CLAMP

TWO BOLT SIDE MOUNTING VIBRATOR



DOUBLE ATTACHING HEAD VIBRATOR

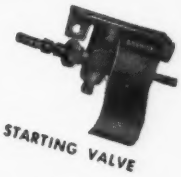
1915
BRANFORD
VIBRATORS
USA

HAND VALVE

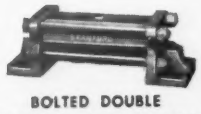
RENEWABLE NOZZLE CLEANER & SPRAYER

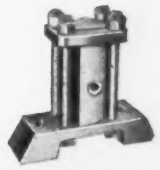
CLEANER & SPRAYER

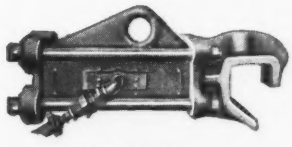
HOSE NIPPLE


STARTING VALVE

HOSE ELBOW


BOLTED DOUBLE ATTACHING HEAD VIBRATOR


END MOUNTING VIBRATOR

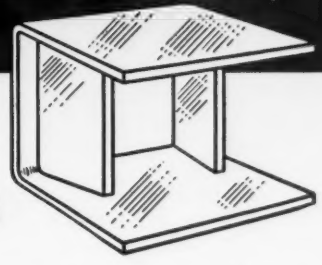

FLASK RAPPER

BLOW GUN 450

The **BRANFORD** *Company*
CONTINUING NEW HAVEN VIBRATOR COMPANY
130 CHESTNUT STREET, NEW HAVEN, CONN.

Circle 782 on Inquiry Card—Page 255

Extra strong, patented design saves money, permits thinner gauges



Buffalo
CHAPLETS

Easier burning in without chilling is the direct benefit of Buffalo Patented Angle Stem and Double Angle Chaplets. The fact that they have added strength, by reason of their exclusive design, permits them to be made in thinner gauges . . . *at savings to you!* In addition, thorough coating makes instant fusion with molten metal a certainty!

Make sure of meeting your chaplet needs exactly. The "Buffalo" line is one of the most extensive in the world.

Complete information in Catalog No. 16

Manufactured by
Combined SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

Circle 783 on Inquiry Card—Page 255

CENTRIFUGALLY CAST

AUTOMOBILE CYLINDER LINERS

DIESEL ENGINE LINERS

BRONZE BUSHINGS

on the new
WATER-COOLED
Model M-WC
(Illustrated)

Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings. Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for new Bulletin # 153 Illustrating Model M-WC

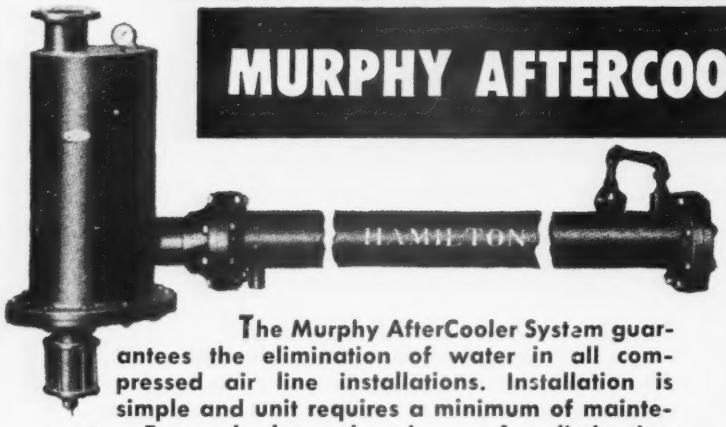
RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal castings at low cost.

Centrifugal Casting Machine Co.
P. O. Box 947 Tulsa 1, Okla.

Circle 784 on Inquiry Card—Page 255

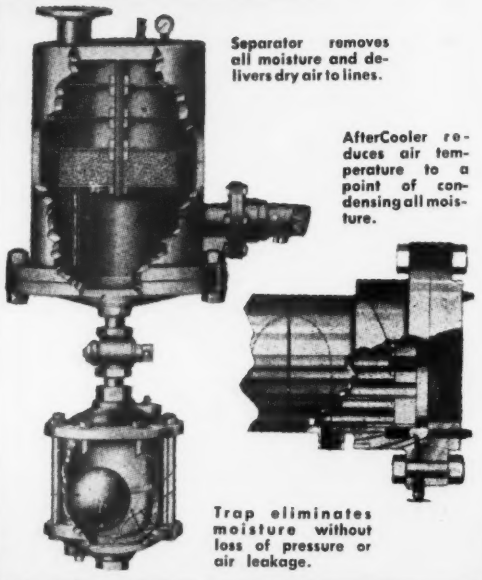
NOW! POSITIVE MOISTURE REMOVAL
FROM COMPRESSED AIR LINES WITH THE
MURPHY AFTERCOOLER SYSTEM



The Murphy AfterCooler System guarantees the elimination of water in all compressed air line installations. Installation is simple and unit requires a minimum of maintenance. For cool, clean, dry air . . . for eliminating "down time" in compressed air operated tools and equipment . . . install a Murphy AfterCooler System in your plant now!

Write today for Bulletin No. 1, outlining complete details on the Murphy AfterCooler System!

GUARANTEED COMPRESSED AIR PRODUCTS
AFTERCOOLERS • SEPARATORS • STRAINERS
TRAPS • SPRAY GUNS • PISTOL SPRAYERS



Separator removes all moisture and delivers dry air to lines.

AfterCooler reduces air temperature to a point of condensing all moisture.

Trap eliminates moisture without loss of pressure or air leakage.

JAS. A. MURPHY & CO. INC.
1421 HIGH STREET • HAMILTON, OHIO

Circle 785 on Inquiry Card—Page 255

LENOX BAND SAW BLADES

CUT GATES AND RISERS FASTER!

The world's largest foundries now use LENOX band saw blades — because LENOX makes a special blade for cutting non-ferrous metals.

Tests show that the famous LENOX "Skip-A-Tooth" blades cut faster and last longer. LENOX "Skip-A-Tooth" has a coarse pitch and a *round* gullet for easy chip clearance.

Which type of blade is best for your cutting operations? Get the answer by writing us. No obligation, of course.

AMERICAN SAW & MFG. CO.
Springfield, Mass.

Please send me complete information on the LENOX Band Saw Blade for cutting Non-ferrous Metals:

☐ Aluminum ☐ Magnesium ☐ Brass ☐ Bronze

Name _____

Address _____

_____

Zircon Sand
Zircon Flour
Silica

BERKSHIRE CHEMICALS

ISCO

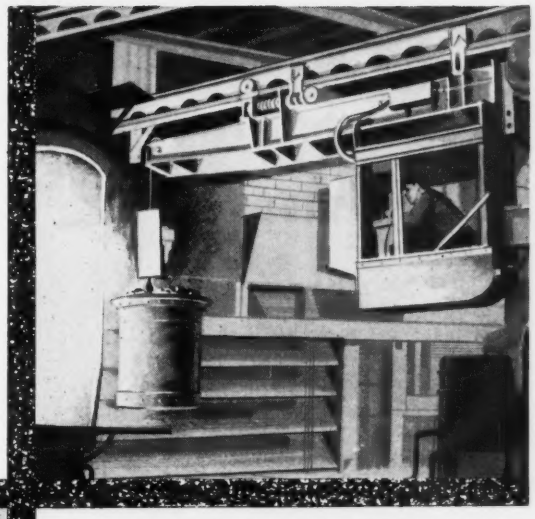
Potassium Titanium Fluoride

Potassium Zirconium Fluoride

BERKSHIRE CHEMICALS, INC.
420 LEXINGTON AVENUE • NEW YORK 17
55 New Montgomery St. • San Francisco 5, Cal.
Innis Speiden Company Division
New York • Philadelphia • Boston • Cleveland • Chicago

Circle 786 on Inquiry Card—Page 255

Circle 787 on Inquiry Card—Page 255



FOUNDRY INSTALLATIONS

Commercial Contracting Corporation has installed or modernized foundries for all the major automotive producers. Utilize this experience to up-date your own foundry facilities.

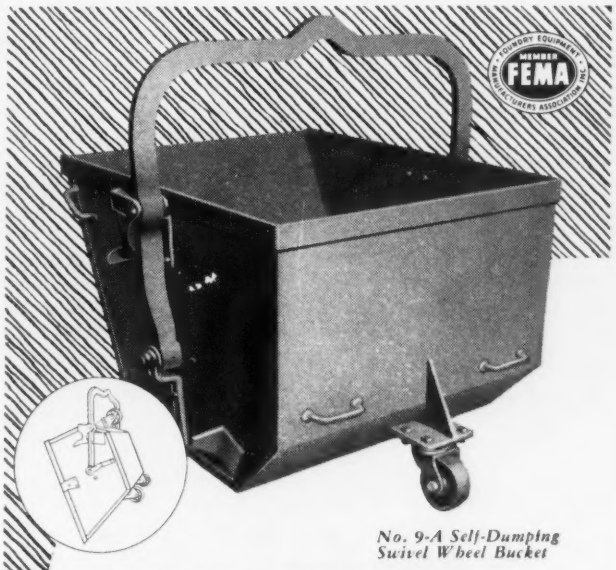
Write for information

COMMERCIAL CONTRACTING CORPORATION

GENERAL CONTRACTORS

12160 CLOVERDALE • DETROIT 4, MICHIGAN

Circle 788 on Inquiry Card—Page 255



No. 9-A Self-Dumping Swivel Wheel Bucket

PENN BUCKETS...

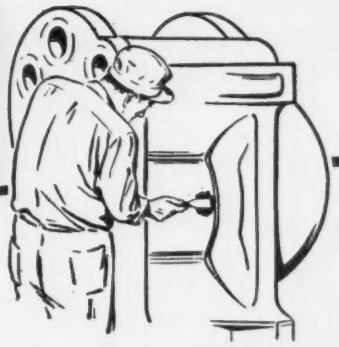
Careful balancing makes Penn Buckets self-dumping when loaded and self-righting when empty. Welded construction prevents "clinging", makes them empty easily and completely. The swivel wheel increases handling efficiency, too.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

PENN IRON WORKS, INC.

READING, PENNA.

Circle 789 on Inquiry Card—Page 255



These features mean

BETTER LOOKING CASTINGS

TIGHT, LASTING REPAIRS

When correcting blow or sand holes, surface blemishes, or rough and porous areas in castings, you can depend on Smooth-On Foundry Cements, standard of the industry for more than 55 years. They are easy to apply, harden quickly, stay firmly in place.

FOUR DIFFERENT SHADES

With 4 different shades to pick from, you know you can get a close match for your castings.

4AA—Light gray, fine texture
4A —Medium gray, medium texture
4B —Dark gray, coarser texture also
9—Bronze or Brass

UNIFORM QUALITY

Rigid quality control means you can be sure that the strength and color of Smooth-On Foundry Cements will not vary from one order to the next. Every lot of Smooth-On cements is laboratory tested and must satisfy tests for setting time, hardness, and color before it is packed for shipment.

FREE SAMPLES

Why not try one or more of these Foundry Cements at our expense? We will be glad to send you a free sample of any of the cements described above if you will write us on your business letterhead. Write today, and see how Smooth-On can improve the appearance of your castings.

SMOOTH-ON MFG. CO. DEPT. 17

570 Communipaw Ave., Jersey City 4, N. J.

SMOOTH-ON

FOUNDRY CEMENTS

SO-388

Circle 790 on Inquiry Card—Page 255

SCHNEIBLE

Ventilation in your foundry a tough nut to crack?

Not if you specify Schneible

You can place your problem in the hands of Schneible engineers with perfect confidence. More than twenty years of experience in foundry ventilation applications go into the recommendation of each piece of equipment for your operation.

There is a Schneible Hood for every need, and the patented features of this equipment have saved foundrymen many, many thousands of dollars through the years.

Schneible Uni-Flo Fractionating Hoods allow you to cut in half the amount of air vented to the dust collector, making your initial equipment investment much smaller.

Schneible Uni-Flo Compensating Hoods maintain a nicely adjusted balance of air in your plant, making better working conditions in all seasons.

All of the Schneible Hoods; shakeout, pouring, mold conveyor, casting cooling, etc., are designed for top efficiency and economy.

Write today for our BVB Bulletin and #450 Foundry Hood Bulletin. You will be pleased with the flexibility of Schneible Hoods.

SCHNEIBLE

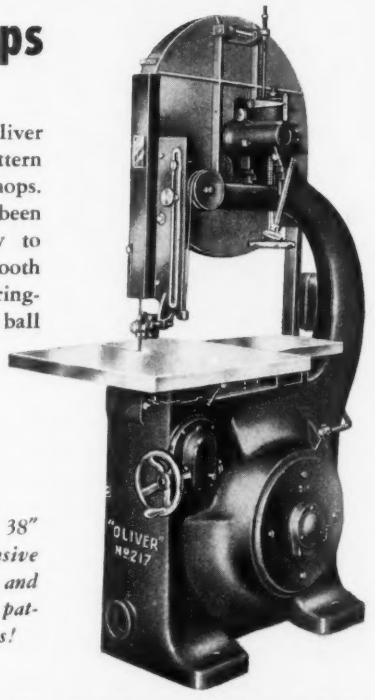
Claude B. Schneible Company
P.O. Box 81, North End Station
Detroit 2, Michigan • Phone TRinity 5-8212

Name _____
Title _____
Company _____
Address _____
City _____ Zone ____ State _____

SERVING FOUNDRYMEN THE WORLD OVER

Circle 791 on Inquiry Card—Page 255

OLIVER 30-in. Band Saw for smooth, accurate work in pattern shops



This sturdy, powerful Oliver Band Saw handles pattern work rapidly in leading shops. Many new features have been built into this Band Saw to promote accuracy and smooth operation. Its high-speed ring-disk wheels, mounted on ball bearings, are the finest ever built! Efficient braking system. Write for Bulletin No. 217D.

Oliver makes 18", 36", 38" Band Saws. Also an extensive line of Pattern Lathes and wood-working machines for pattern shops. Get all the facts!

OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

Circle 792 on Inquiry Card—Page 255

HIGH SILICA QUARTZITE PEBBLES

★ ★ ★

R. W. SIDLEY, INC.

THOMPSON, OHIO TEL. 2701

Circle 793 on Inquiry Card—Page 255

EF

GAS, OIL AND ELECTRIC FURNACES

For all annealing and heat treating requirements

THE ELECTRIC FURNACE CO. • SALEM, OHIO
Canadian Associates • CANEFCO LTD. • Toronto 1, Canada

Circle 794 on Inquiry Card—Page 255

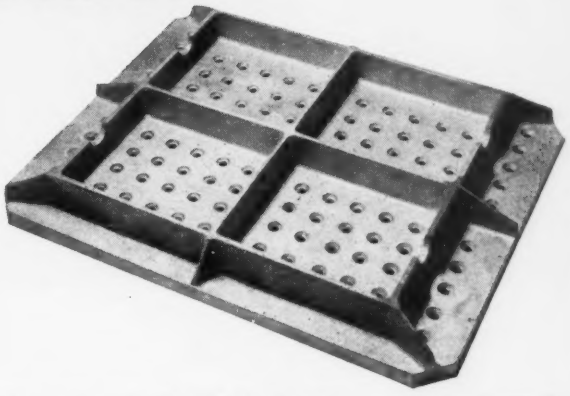
EMPIRE

"THAT GOOD" FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION
2201 First Ave., North • Birmingham 3, Ala.
Phone: ALpine 1-9135

Circle 795 on Inquiry Card—Page 255

NEW ALUMINUM BOTTOM BOARDS



CUT FOUNDRY COSTS

- Will not warp or burn
- Give long lived service
- Eliminate repairs
- Assure uniform molds each cast
- Not affected by weather
- Eliminate stacking problem
- Raised sand strip (optional) around outer edge peens each mold uniformly and eliminates sand slippage
- Rib reinforced for added strength and durability
- Completely cast of aluminum with vent holes on face to permit gas escapement
- Insures better molds at less cost
- Can be furnished with or without sand strip

Write for prices on standard sizes

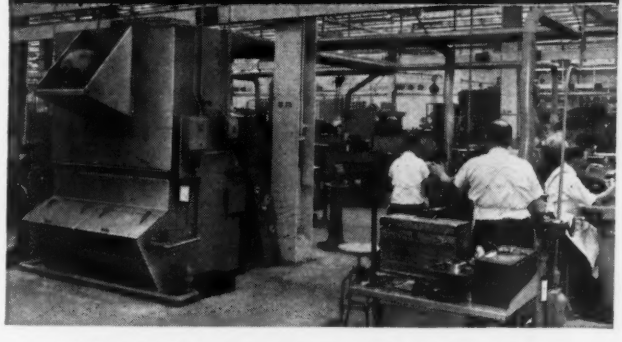
JO-EL COMPANY

14209 Leroy Ave., Cleveland, Ohio
Phone ORchard 1-5787

Circle 796 on Inquiry Card—Page 255

ND NEWCOMB-DETROIT EST. 1912

- INDUSTRIAL OVENS
- DUST COLLECTORS
- SPRAY BOOTHS
- PARTS WASHERS



UNI-WASH DUST COLLECTORS

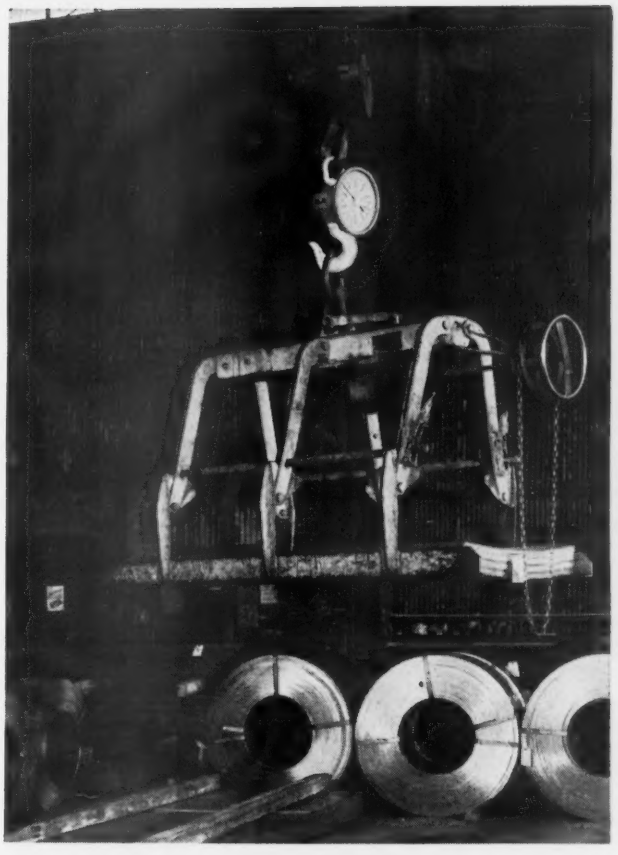
Compact, complete recirculating Water-Type Dust Collectors for industrial processing dusts. Dirt is collected as wet sludge which may be carried away automatically. No moving parts. Extremely efficient for grinding operations. Eliminates danger of explosion from magnesium and aluminum dust. Proven in foundries. Standard Units available.

For Bulletins and Quotations, write to:

NEWCOMB-DETROIT

5755 RUSSELL ST. • DETROIT 11, MICH.

Circle 797 on Inquiry Card—Page 255



HOW TO INVENTORY A STEEL COMPANY WAREHOUSE

The easy way

This steel warehouse made the not-too-startling discovery that the simplest way to take a physical inventory is to lift each roll or package of steel a short distance off the floor, weigh it with a Martin-Decker SU-20 Sensater hook scale, and then set it back down in place. The amazing thing is the number of companies that continue to take inventory by the tedious, old-fashioned method of moving the entire contents of warehouse, one piece at a time, to a platform scale, and then returning it to the original locations by the same laborious process, when they could use the simple, weigh-it-in-place Sensater method at a fraction of the time and cost.

This is but one of the hundreds of uses for the versatile Sensater, the only hydraulic crane scale accurate enough to be certified, yet rugged and compact enough to meet industry's exacting demands.

For full particulars, write Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif., Dept. AT-15.

MARTIN-DECKER CORP.

HOME OF THE WEIGHT INDICATOR — LONG BEACH, CALIFORNIA

Circle 798 on Inquiry Card—Page 255

125 YEARS IN CHEMICAL SERVICE...

SOAP TO SILICATES

Soap, our first product in 1831, was followed 25 years later by silicate of soda used in our soaps. Silicates became our exclusive interest in 1904.

PQ research in special silicate properties has uncovered and developed new silicates for many valuable uses such as detergents for metal cleaning, sealants for porous castings, binders for cements.

Choose from our 40 products, liquid and dry ($2Na_2O:SiO_2$ to $Na_2O:3.75\ SiO_2$),a silicate for every need.

1831-1956 METSO PQ 125th ANNIVERSARY

PHILADELPHIA QUARTZ CO.
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9 Plants . . . . . Distributors in 70 Cities
TRADEMARKS REG. U.S. PAT. OFF.

PQ SOLUBLE SILICATES / METSO DETERGENTS

Circle 799 on Inquiry Card—Page 255

Core Wire Straighteners GIVE YOU BIG SAVINGS!

K&R Straighteners are saving foundries substantial sums monthly! Many of the larger foundries employ multiple installations of K&R Straighteners. These machines re-straighten core wire to a usable condition — over and over again — as long as it remains ductile. There are two machine sizes: DX-5 for wire 1/8" to 3/8" dia. and F-5 for wire 3/16" to 5/8" dia. Bulletin 58B contains all the facts. Send for your copy today.

Kane & Roach
INCORPORATED
SYRACUSE, NEW YORK • ESTABLISHED 1887

Circle 801 on Inquiry Card—Page 255

FOUNDRY

EDWIN S. CARMAN, INC.

LEE ROAD AT MAYFIELD
CLEVELAND 18, OHIO

A COMPLETE FOUNDRY SERVICE

MECHANIZATION

Circle 800 on Inquiry Card—Page 255

COST REDUCTION PROGRAMS

★*Organization*
★*Methods Improvement*
★*Job Evaluation*
★*Wage Incentives*
★*Budgetary Controls*
★*Diversification*

WALLEY & ASSOCIATES
SURVEYS • INSTALLATIONS • TRAINING
323 Third National Building, Dayton 2, Ohio

Circle 802 on Inquiry Card—Page 255

GLOSSARY OF FOUNDRY TERMS

Compiled by Ed Bremer, FOUNDRY Metallurgical Editor

This extensive glossary of foundry terms was compiled from a wide variety of sources. Arranged in handy booklet form, it is a valuable reference for every foundryman. 48 pages.

$1.00

PENTON PUBLISHING COMPANY, Book Department
1213 West Third St., Cleveland 13, Ohio

send for this valuable quick-reference 17" x 22" standard alloy wall chart FREE

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This see-at-a-glance wall chart will save you hours of time in making up your specs. Chart shows all types of customer specifications: Navy, S.A.E., A.S.T.M., and Federal. It shows chemical composition, by percentages, of 37 alloys. Write for your copy to:

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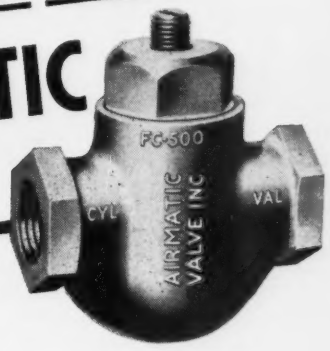
ZINC BASE ALLOYS • BRASS, BRONZE & ALUMINUM INGOTS • LEAD & TIN BASE ALLOYS • CADMIUM & ZINC ANODES

Circle 803 on Inquiry Card—Page 255

OFF THE SHELF SERVICE

AIRMATIC valves



Your best source for air-hydraulic control valves. Save time . . . Save money on immediate delivery.

Flow Control Valves

Airmatic Valves are simple in design—compact. Yet they are extremely efficient in performance and adaptability . . . Afford best arrangements for machine tool application. A complete line of 2-way, 3-way, and 4-way valves available for either high-pressure or low-pressure installations.

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Attractive O. E. M. and Quantity Discounts

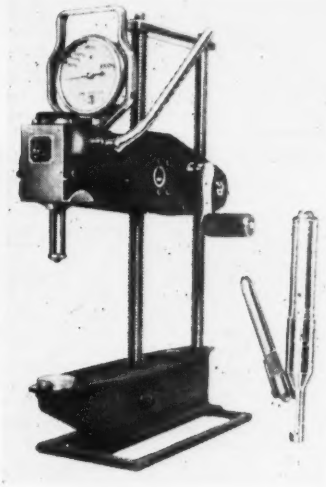
Delivery from Stock —Immediate

AIRMATIC VALVE INC.
7317 Associate Ave. Cleveland 9, Ohio

Circle 804 on Inquiry Card—Page 255

Insure Quality Control of Castings

through accurate hardness tests



For over a quarter of a century, King Portable Hardness Testers have set the standard for portable Brinell Machines. Precision testing of parts of any size, in any position, anywhere, utilizing a 3000 Kg. load on a 10 MM. ball giving a clear sharp impression, are some of the principal features. This high standard of accuracy and performance has been integrated into a system of standard adapters for use with the basic unit, making the King Portable Brinell a machine of universal application. Weighs only 28 lbs. Write for complete description and specifications.

KING TESTER CORPORATION

DEPT. F 440 N. 13TH ST. PHILADELPHIA 23, PA.

Circle 805 on Inquiry Card—Page 255

No preheat or postheat was needed to join these two 8300-lb. ductile iron castings of this foundry shake-out grate.

Shake-out grate proves

NI-ROD "55" WELDS DUCTILE IRON SOUNDLY

This ductile cast iron grate has taken more than 10 months of rough treatment in a foundry shake-out. It has been battered by 55-ton castings. But the NI-ROD "55"* welds show no sign of opening up. Not a sign of a crack.

That is proof you get sound ductile welds in alloy cast iron as well as ordinary iron castings with NI-ROD "55" electrodes. And you get other advantages. When you repair defective castings, NI-ROD "55" welds *machine easily*. They match the color of the cast metal closely, too.

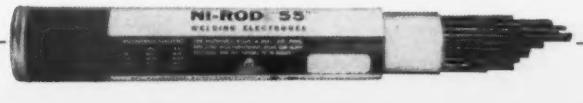
Use NI-ROD "55" electrodes to simplify cast iron welding. *(Nine out of ten jobs will need no preheat or postheat!)* Order a 5 lb. trial package from your supplier today.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Welding Products**

Electrodes • Wires • Fluxes



Circle 806 on Inquiry Card—Page 255

CLASSIFIED ADVERTISING

Help Wanted

TECHNICAL SERVICE REPRESENTATIVE

Top national company, major supplier to metals-producing industry, requires mature man with sales sense, capable of discussing technical matters with customer management, supervisory and operating personnel in the field, and possessing ability to handle technical reports and correspondence. Attractive salary commensurate with experience and progress.

Engineering degree or comparable experience necessary. Knowledge of metal production processes, particularly electric arc or blast furnaces, desirable, but not absolutely essential.

Location New York City. Permanent position for right man. Submit resume and personal data to:

BOX 348, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

DEVELOPMENT METALLURGIST

For alloy development projects in the production of cast irons and cast or wrought nonferrous products. Engineering degree and five or more years' practical experience with operating equipment and processes. Capable to conduct systematic and constructive metallurgical investigations in melting, alloying and casting. Fine opportunity for seriously interested young metallurgist to gain valuable experience and to qualify for future promotion in progressive, nationally known corporation. Confidential.

BOX 289, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

PATTERN SHOP SUPERVISOR

Semi-production gray iron foundry Central Indiana has position for young aggressive patternmaker who has desire to advance with an expanding organization. In reply give full qualifications.

BOX 301, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

NONFERROUS FOUNDRY FOREMAN

Medium size aluminum foundry near Cleveland, specializing in medium and large jobbing work. Must know all phases of foundry operations and aluminum alloys. In reply, give age, experience, references, and include a photograph. Address: Box 305, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOREMAN

Gray iron jobbing foundry near Cleveland needs a dry sand foreman for medium and large floor work. In reply give age, experience, references and include photograph. Address: Box 274, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

PATTERN SALES REPRESENTATIVE

Modern, well-equipped and established pattern shop with A-1 rating in middle west, 75 miles from Ohio-Indiana and Kentucky lines. Need patternmaker with some foundry experience along with a practical and technical experience in wood and metal patternmaking to expand our sales force.
Should be able to quote pattern prices and handle customer relations in 150 mile area. Would consider training the right man. Salary open.
Please submit resume and salary expected. All replies kept confidential.

BOX 325, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY TECHNICIAN OR QUALITY CONTROL ENGINEERING ASSISTANT

Mechanized gray iron foundry in Ohio producing quality engineering jobbing castings. Applicant should have some technical background, training or experience in one or more of the following fields—Metallurgy, Cupola Control, Sand Control, Gating and Risering.
This position will offer many opportunities in increasing efficiency and control of all foundry operations including practical research, development and application on new foundry processes such as shell process and CO_2 process. Earnings will be dependent on qualifications and ability.

BOX 320, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY MANAGER

Central New England foundry requires the services of technically trained man with gray iron experience. This is a permanent position with an old established company. In reply, give resume of education and experience as well as salary expected.

BOX 328, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY DEVELOPMENT ENGINEER

Well established research organization in the gray iron castings field has an opening for a development engineer interested in application of results of research to plant practice. Engineering training with at least 3 to 5 years' plant experience highly desirable. Applicant should have an interest in the technical aspects of all phases of foundry practice with principal interests in sands, gating and risering. Some traveling involved. Must have ability to write concise reports and exercise initiative in carrying out a project. In replying give educational background, foundry experience and brief biographical sketch. Address: Box 333, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

EXPERIENCED STEEL FOUNDRY METALLURGIST

Wanted for shop producing carbon low alloy, and high alloy steel castings. Excellent opportunity. Location: Northeast section of the United States. In reply, please send resume of education, background and experience also state salary required. Address: Box 324, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGICAL ENGINEER GRADUATE

Middle west commercial steel foundry needs theoretically trained engineer to help keep the organization abreast of technical developments, and to work on quality control programs. Proper applicant will be required to attend all technical society meetings pertaining to steel foundry activities. Address: Box 313, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

STEEL MELTER ELECTRIC FURNACE

Foundry producing carbon low alloy and high alloy castings in East. Give particulars including experience and salary requirements. Address: Box 327, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

ASSISTANT CHIEF ENGINEER

MAGNESIUM FOUNDRY

We are a well established medium sized Chicago Foundry with an expanding operation under an aggressive management group.
We would like to receive a brief resume from you if you would like to join the management team. You should have experience in the engineering of aircraft quality magnesium sand castings. You should also be able to handle liaison work with customers regarding casting design and quality control problems.

Salary will depend upon experience.

All replies strictly confidential.

BOX 283, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

COREROOM FOREMAN
MOLDING FOREMAN
COREMAKERS
MOLDERS

A jobbing and captive foundry specializing in producing large and heavy castings has positions available for Coreroom Foreman, Molding Foreman, Coremakers and Molders. A rapidly expanding concern with excellent opportunities for qualifying applicants. Located in the Upper Peninsula of Michigan. Must have experience producing large and heavy castings. Submit qualifications to:

BOX 311, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGICAL ENGINEER

Assistant in staff group engaged in testing and control of foundry alloys, sands, etc. and "trouble shooting". Firm operates nonferrous foundry. Well recognized in its field, under progressive management. Offers opportunity for advancement for competent young man.

BOX 316, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

ASSISTANT COREROOM FOREMAN

Experienced in medium and heavy jobbing gray iron foundry. Compensation commensurate with ability and experience. Foundry location is approximately 100 miles from Milwaukee.

BOX 329, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

An Eastern malleable iron foundry is interested in employing a foundry superintendent with knowledge of all phases of foundry operations. Please forward resume of qualifications experience, references and salary requirements.

BOX 335, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY FOREMAN

For Northern Ohio gray iron foundry employing 45 men on jobbing work. Opportunity for ambitious young man to supervise molding and coremaking. Send complete resume including age, weight, height, experience, salary desired, references, etc. Address: Box 332, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

METALLURGIST OR METALLURGICAL ENGINEER

For work in gray cast iron. B. S. Degree and some melting experience desirable. Duties would involve service and development work on alloys in iron. Moderate travel.

BOX 339, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST

Well established malleable iron foundry in the East seeks experienced metallurgist. Please submit resume of qualifications and experience, references and salary expected.

BOX 334, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Medium-size production jobbing gray iron foundry in Southern Ohio needs qualified practical foundryman to take complete charge of all foundry operations. Give full particulars in first letter including age, height, weight, experience, education, salary requirements and references. Address: Box 280, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOREMAN

For Southern Ohio gray iron foundry employing 90 men on production jobbing. Excellent opportunity for ambitious young man to supervise molding and coremaking. Send complete details including age, experience, salary desired, references, weight and height. Address: Box 281, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRADUATE ENGINEER

Or Metallurgist with some background in melting aluminum. Will be trained in special casting process to eventually take over operation of department. Excellent opportunity for man with leadership ability. Submit resume of education and experience, and state salary requirements. Address: Box 326, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOREMAN

For Southeastern ductile iron, brass and aluminum foundry. Must have served time as a molder. Prefer between the ages of 25 through 40. Excellent opportunity. Send snap shot and full resume. Address: Box 309, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

LAYOUT MAN

For metal pattern shop. Paid vacations and holidays. Steady employment. PROCESS PATTERN & ENGINEERING CO., INC., 1707 N. HARRISON ST., FORT WAYNE, INDIANA.

Positions Wanted

MANAGER OR SUPERINTENDENT

Have forty years' practical experience in foundry, molder for sixteen years. Have been foreman, superintendent and general manager. Was superintendent of three largest foundries in St. Louis, Missouri, largest one in Chicago, Illinois. Understand gray iron, semi-steel, brass, aluminum, rigging jobs to get best production at lowest cost, cupola, also mix of various metals; estimating jobs from blueprints. Can give best of references. Available immediately. Address: Box 300, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY MANAGER AND METALLURGIST

Presently managing gray iron foundry seeking new affiliation with progressive gray iron or malleable foundry or sales organization. Experience in management, technical, sales and operational phases of gray iron and malleable. Age 35 Address: Box 338, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GENERAL FOREMAN CLEANING ROOM

Thoroughly experienced in all phases of Cleaning Room operations. Now employed. Wish to relocate. Would like position with future. Have good cost-quality-labor relations record. 35 years of age. Resume upon request. Address: Box 269, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Employment Service

FOUNDRY PERSONNEL SPECIALISTS

National Placement and Procurement of
GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS.

Confidential Inquiries Invited
From Employers and Qualified Applicants.
For Fast Competent Assistance Contact

DRAKE PERSONNEL, INC. HARRISON 7-8600
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SALARIED PERSONNEL

$5000-$30,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, P.O. BOX 674, MANCHESTER, VERMONT.

Positions Wanted

MANAGER-SUPERINTENDENT

Practical gray iron foundryman, molder by trade, technically trained. Graduate metallurgist 26 years' experience jobbing and highly mechanized production foundries, castings to twenty tons. Well versed all phases metal, sand control, molding, rigging, costs, gating and risering etc. at minimum costs and scrap. Have the ability and know-how to produce results. Will demonstrate to reliable firm. Address: Box 321, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Would like to contact president who wants to unload foundry headache on practical foundryman who has broad experience in medium and heavy castings, both jobbing and captive foundries. Work from blueprints, well versed in metal, sand control, costs, rigging, cores, all phases of operation. Address: Box 322, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WORKS MANAGER-SUPERINTENDENT

Capable of operating a 350 man organization. 23 years of experience in casting ferrous and nonferrous metals in sand, permanent and investment molds profitably. Address: Box 319, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

Veteran, available February, 1957. Master of Science degree in Metallurgical Engineering; 1½ years metallurgical experience in nonferrous foundries. Prefer nonferrous or alloy steel. Would like to relocate on West Coast or in California. Address: Box 323, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thoroughly versed in all phases of ferrous and nonferrous foundry operations. Capable of producing efficiently and profitably. Address: Box 312, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GENERAL FOUNDRY FOREMAN

Age 42, with 23 years' experience in light, gray iron jobbing and semi-production foundry. Well versed in all jobbing shop problems. Practical foundryman with some technical knowledge. Address: Box 336, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CLEANING SUPERVISOR

Five years time study, six years cleaning foreman and department head, steel and alloy castings. Best references. Good employee relations. Address: Box 303, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

Thirty years' experience, practical and technical, gray iron jobbing and production. Well versed all departments. Presently employed as superintendent. Address: Box 273, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Available, thorough and practical, green and dry sand molding, coremaking, melting, costs, customer contacts, consulting and advisory work. Good handler of men, along in years. Plenty of know-how. Address: Box 293, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOREMAN

Thorough knowledge of all phases of nonferrous metals. Green sand, skin dry or French sand, and tablet or false core molding. Thirty years' experience. Desire to make change. Address: Box 343, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundry Consultant

FOUNDRY ENGINEERING

Equipment Arrangements
Foundry Costs
Application of techniques for maximum production economies.

CLYDE L. FREAR
3509 OLD DOMINION BLVD.
ALEXANDRIA, VIRGINIA
PHONE TEMPLE 6-8083

Representative Available

AGENCY SEEKS TO REPRESENT

Progressive sales agency, currently representing a malleable iron foundry seeks to represent exclusively a reliable production nonferrous metals foundry for New York (including New York City) and New Jersey.

BOX 278, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

REPRESENTATIVE AVAILABLE

Castings salesmen (Comm.) living in the Detroit area desires a connection with foundry for ductile and gray iron castings. Must be competitive and dependable. Over ten years' experience. Address: Box 331, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Representatives Wanted

SALES REPRESENTATIVE

Large gray iron foundry in Chicago territory would like to engage the services of a sales representative who is interested in the foundry industry and has had one year or more of customer contact. Must have the ability to read blueprints and be willing to train approximately 6 weeks in our foundry.

BOX 330, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES REPRESENTATIVE

Metropolitan area of New York, for a large N.Y.C. aluminum and bronze foundry, having its own pattern shop. Drawing against commission. Must be experienced and have a following. Opportunity for executive position in near future. All replies confidential.

BOX 317, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES REPRESENTATIVES

Michigan, Illinois and Indiana. Successful foundry supply sales experience essential. Profitable, frequent repeat additions to your present lines. Attractive commission. Replies confidentially treated. Write resume of experience and present lines. Address: Box 314, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Opportunity

PERMANENT MOLD METHOD AVAILABLE

THE WAGNER PERMANENT MOLD CO., 2910 Empire Ave., Burbank, California, has developed a Permanent Mold Method for ferrous and nonferrous metals and invites inquiries from any country regarding this method and process.

Wanted-To-Buy

WANTED

Osborn Roto-Lift Molding Machine Model No. 3161

PEORIA MALLEABLE CASTINGS CO.
PEORIA, ILLINOIS
PHONE: 2-5401

WANT TO BUY

Interested in buying a small to medium-size foundry producing Niresist, Nihard and similar heat, corrosion and abrasion resistant castings. Please submit complete details in first letter in strict confidence. Address: Box 295, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

W A N T E D

Dust collector capable of handling minimum of 6600 CFM—State price and condition. Address: Box 318, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address: Box 578, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED

Osborn Rota-Lift molding Machine, Model #3131. Address: Box 177, LeClaire, Iowa.

Foundries For Sale

FOR SALE
GRAY IRON FOUNDRY
East-Central Ohio

Gray iron foundry suitable for cope and drag, squeezer, floor and bench molding. Gas core ovens. 72" cupola, 85,000 square feet on 10 acres. Property fenced. Buildings sprinklered. Plus labor area in agricultural community. Convenient rail facilities.

Box 310, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY FOR SALE

Foundry, gray iron and semi-steel, operating over 100 years, making castings up to ten (10) ton each. Yearly sale approximately $700,000.00, railroad siding, Western New York, for rent on long term lease. Present owner will purchase $250,000.00 of his castings a year from party which leases property. Address: Box 349, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SMALL FOUNDRY FOR SALE

Well-equipped foundry in Eastern Pennsylvania. Has overhead crane, cleaning equipment. Plenty of adjacent land. On railroad. Address: Box 315, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

For Sale

FOR SALE

469 Palmer-Bee casting cooling bucket. 30" inside diameter, 20" deep. ½" steel plate bottom. 3/16" steel plate sides perforated for cooling with steel bales of ¾" x 2" bar.

CENTRAL FOUNDRY DIVISION
GENERAL MOTORS CORP.
DANVILLE, ILLINOIS

FOR SALE

Ekstrom, Carlson 112-A 8" belt sand 7½ H.P. motor, double backboard.
20 KW Ajax stationary aluminum holding furnace with panel.
Royer sand separator, Model "JR".
Lindberg-Fisher gas tilting furnace, 125 lb. capacity.
Ajax-Northrup nose tilting type furnace shells, one 50 lb. and one 100 lb.
Ecco high frequency SM 33-6H centrifugal casting machine.

ALLOY PRECISION CASTINGS CO.
CLEVELAND 11, OHIO
CL 2-3650

FOR SALE

Wheelabrator "Tumblast" 42 x 48 in good condition. 1947 model but recently overhauled. $4100.00.

CHAPIN CYLINDER HEAD COMPANY
CHAPIN, ILLINOIS

For Sale

FOR SALE

We have the best selection of HARD CHROME REBUILT PNEUMATIC TOOLS WE HAVE EVER HAD.

Ingersoll-Rand Size 24 Floor Rammers
Ingersoll-Rand Size 14 Bench Rammers
Cleco Bench Rammers
Chipping Hammers—All types
Core Breakers and Grinders

Our prices are about half the cost of new tools. All tools sold by us are guaranteed and can be returned if found not satisfactory.

Repair and Rebuilding Service on all Pneumatic Tools

CENTRAL PNEUMATIC SERVICE COMPANY
512 LINDEN AVE., DAYTON, OHIO
TELEPHONE: MADISON 2701

HIGHEST BID SALE

Because of a Surplus of Sand Blasting Equipment we are offering the following stock to the HIGHEST BIDDER. DEALERS INVITED. Awards to be given Nov. 15, 1956

1 48x48 Wheelabrator Tumblast
3 42x48 Wheelabrator Tumblast
1 36x42 Wheelabrator Tumblast
1 15" Wheelabrator Continuous Tumblast
1 Pangborn Table E.S.421 Shell Machine
1 Pangborn 14 GK 2 Rocker Barrel

Following Not Included

BOUGHT	SOLD	TRADED
48 x 48 Wheelabrator Tumblast	.....	$5,000
42 x 48 Wheelabrator Tumblast	.....	2,500
36 x 42 Wheelabrator Tumblast	.....	3,000
27 x 36 Wheelabrator Tumblast, Steel or Rubber Belt	.....	3,000
8' American Table	.....	2000.00
8' LF Pangborn Table	.....	2500.00

Pangborn E.S. 347-4 wheel grit blast unit used for motor heads or motor blocks, good condition. $8,000 FOB Detroit

Vapor Blast Cabinets, Singles $600.00
Vapor Blast Cabinets, Doubles 900.00

Filters for American Dustube Collector .50 each
All types and sizes of Hand Cabinets; Dust Collectors; Pressure Tanks, Rooms; Horizontal or Vertical Tumbling Barrels and additional sand blast equipment too numerous to mention.

PHONE OR WRITE
DIAMOND SALES, INC. DET. 9, MICH.
5654 W. JEFFERSON PHONE: VI-36750

FOR SALE
MOTORS—GENERATORS
TRANSFORMERS

Unused — Rebuilt
WORLD'S LARGEST INVENTORY

ELECTRIC EQUIPMENT COMPANY
Phone Station Collect GLenwood 3-6783
P.O. Box 51—Rochester 1, New York

FOR SALE

1—Roots-Connersville Blower 14 x 36, model RCDH, maximum delivery 8000 CFM at 3.5 PSI. Complete with Foxboro control equipment and Burgess-Manning snubber, catalogue #STC-L-16 and Allen Bradley electric control equipment and 60 HP motor. Purchased new in 1951.

MEECH FOUNDRY, INC.
9906 MEECH AVENUE CLEVELAND 5, OHIO
MICHIGAN 1-5550

FOR SALE

Approximately 110 Steel Bins, 21" deep, 24" wide, 38½" long, outside measurements. Ideal for handling castings with Fork-Lift, after welding angle iron on bottom. Approximate weight 140 pounds each. Price $15.00 each, f.o.b. our plant.

BOX 282, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOR SALE

1—Used Model "M" Beardsley & Piper Screenarator in good operating condition. 3 phase, 60 cycle, 220 volt motor. Price $400.00 f.o.b. Little Falls, New Jersey. Also have good stock of new repair parts for this machine which may be purchased. Address: NORTH JERSEY FOUNDRY CO., INC., 453 MAIN STREET, LITTLE FALLS, NEW JERSEY.

For Sale

FOR SALE

MOLDING MACHINES
1—Tabor 22" Power Jolt, Rollover, Draw, Portable, 22" x 32" Table.
1—Milwaukee jolt-squeeze stationary.
1—Herman, Jolt, Rollover Draw, 6000#, 40" x 60" table.
2—International, Jolt, Rollover Draw, 24" x 10G, Stationary.
2—No. 275 Osborn jolt squeezers. Stationary.
2—SPO Jolt Squeeze strip—13"
CORE OVENS
1—Coleman Recirculating 4 section with 5 drawers per section. Gas fired.
BLOWERS FOR CUPOLAS AND FURNACES
1—Connersville rotary blower, 6000 CFM.
1—Connersville Rotary Blower, 3500 CFM.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
2—Connersville Rotary 14" x 27" HD, 2750 CFM at 5# press.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—2 HP 20 oz. Spencer Turbine Blowers.
1—Spencer Turbine Blower, 2700 CFM, 27 oz., 30 HP, 3/60/220-440 V.
METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnace, gas fired.
1—Hausfeld tilting crucible, gas fired, 500# brass.
1—Hausfeld Stationary Brass, oil or gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# A1, Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
1—#2 U.S. rotary melting furnace, 500# brass.
MISCELLANEOUS
2—Hydro-Blast barrels with 25 HP pumps.
3—Jib cranes, 16' swinging beam, 2000# cap.
1—International SB-11 core blower.
2—Pangborn cloth screen collectors, 2 Hp.
1—Stoney crane type shakeout.
1—NDP Royer sand separator.
1—#16 Roto-clone unit complete.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

4 Newaygo Super Handy Sandy units complete with driving motors, steel service platforms and access ladders. Model SHS-7-G single hopper, air operated, discharge gate and swing chute. 43 cubic feet lower storage and 120 cubic feet overhead. These units, bought new in January, 1956, never used, due to change in operations. Will sell singly or as a group. Sand handling capacity 35 TPH each.

MARION MACHINE, FOUNDRY AND SUPPLY CO.
P.O. BOX 989
MARION, INDIANA
PHONE 412

FOR SALE
TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
12300	24oz.	Spencer			
8375	20oz.	Spencer	380	16oz.	No.Am
6000	32oz.	Ing.-Rand	340	20oz.	A-B
4700	32oz.	Ing.-Rand	320	12oz.	Spencer
2500	7oz.	Sturt.	9000	6"SP	Northern
1300	16oz.	Spencer	3420	8"SP	N.Y.
800	13oz.	Buffalo	2700	⅝"SP	Ilg
400	12oz.	Buffalo	2500	½"SP	American
450	7oz.	Spencer	1100	4½"SP	Bayley
400	16oz.	No.Am.	2344	2"SP	Clarage

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

FOR SALE

Four Osborn Model 2047-3 Rollover jolt molding machines, serial #10867-BN. Core box 21¼ x 22¼, flask space 11⅛", pattern draw 8" Never used.

TRIPLEX MACHINE TOOL CORP.
75 WEST STREET
NEW YORK 6, NEW YORK

BAKER LULL SHOVELOADER

Model 20, 12 cubic foot capacity, with Mitco solid front and rear tires. This unit has never been used and is about one year old. We no longer handle the line and will sell for 25% off of list. Net price $2900.00 F.O.B. Milwaukee.

SEDGWICK-HAMM EQUIPMENT CO., INC.
1815 SOUTH 108TH STREET
MILWAUKEE 14, WISCONSIN

For Sale

FOUNDRY MACHINERY AND EQUIPMENT BOUGHT AND SOLD

One piece or a complete foundry

Prompt Action

Mullers—Rollovers

Squeezers—Slingers

Flasks — Blowers — Grinders

Wheelabrators, etc.

HOMAN MACHINERY COMPANY
824 REEDY ST.

CINCINNATI 2, OHIO
MAin 1-4634

FOR SALE

1—Simpson Mixer, #2, 20 HP motor.
Miscellaneous: Screens, Pulverizers, Grinders, Tyler Rotap Screens etc.
Wanted: Your Idle Machinery.
OUR 39th YEAR

CONSOLIDATED PRODUCTS CO., INC.
66 BLOOMFIELD STREET
HOBOKEN, NEW JERSEY
HO 3-4425 N. Y. TEL. BA. 7-0600

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

For Sale

FOR SALE

SPO 110 jolt squeeze	$235.00
Osborn 275 PJ jolt squeeze	225.00
Tabor jolt stripper 10" pin lift	300.00
Tabor 10" molding machine	100.00
Gehnrich & Gehnrich preheating oven 600°F, 6' wide, 6' deep, unused complete with controls	900.00
Burring booth, Newcomb-Detroit, magnesium, 15 HP motor	750.00
Uniwash dust collector, 5600 CFM, Newcomb-Detroit, 10 HP motor, unused	700.00
Wheelabrator Tumblast 36" x 42" with dust collector	2750.00
Wheelabrator cabinet, 2 wheels will handle casting 4' x 10"	5500.00
Wheelabrator cabinet, 30' x 15' will handle work 3'8" x 5'7"	4500.00
Pangborn EN2 cabinet with dust collector, motor and blower	490.00
Pangborn dust collector, CK220, with 5 HP motor and blower, 2000 CFM	500.00
Pangborn 2CD1 dust collector, 1400 CFM, with 3 HP motor and blower	475.00
Detroit hardness tester, motorized	350.00
Tinius Olsen, motorized	300.00
Cogan hardness tester, motorized, 7500 KG	450.00

M. ELSTEIN
422-426 GRAND STREET
JERSEY CITY 2, NEW JERSEY

FOR SALE

1—48 x 48 Heavy Duty American Wheelabrator Tumblast capable of handling castings up to and including 250 lbs. including complete electrical equipment for 440 volt, 60 cycle, 3 phase current. Serial #A-25079.

1—American Tumblast Loader complete with electrical equipment for 440 volt, 60 cycle, 3 phase current.

BOX 296, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MOLDING MACHINE

Herman 6000# cap. jolt-roll-draw in operating condition. $2900 f.o.b. POTTSTOWN MACHINE CO., POTTSTOWN, PA., (H. H. Houston). 15% to any established dealer.

For Sale

GUARANTEED MACHINES AT LOWEST PRICES

Jolt Squeeze Strip Molding Machines
213 SPO; 4½" jolt; 13" sq.
2114 SPO—11" sq.
2136 SPO—13" sq.
720 U Osborn—11" sq.
International PKL—14 x 5½
Jolt Rollover Molding Machines
Tabor—30" x 40"; 12" draw; shockless—1000# cap.
2047 Osborn; 18" x 24"; stationary
601 Osborn; 30" flask
602 Osborn; 36" flask
605 Osborn; 54" flask
Jolt Squeezers
275J Osborn; 16 x 20; 10" sq. cyl.
276 J Osborn; 17 x 26; 13" sq. cyl.
113 J SPO; 17 x 26; 13" sq. cyl.
103 Milwaukee; 10" sq.—4½" jolt dia.
Core Blowers
Redford Core Blowers
#193 Osborn—for medium cores
#94 Osborn—for large cores
Material Handling Equipment
Model HA Hough Payloader
Clark Fork Lift Truck—6000 lb.
Elwell Parker Fork Lift Truck—4000 lb.
Mercury Fork Lift Truck—2000 lb. Elec.
Lewis-Shepard Platform Lift Trucks
Furnaces
2000 lb. Stroman—Tilting Hydraulic
2000 lb. Fisher—Aluminum
350 lb. Detroit Rocker Barrel—Complete
Core Ovens
Dielectric—Model 900A and 1800A. Set up in your shop in operating condition. Less than one-half price.
Miscellaneous Foundry Equipment
U.S. 7½ HP 3 speed grinders; 28" wheel
Model S Screenerator—B&P
Royer Screenerator
Climax Wire Straightener
Model AA American Sandcutter
Jib Cranes—2 ton capacity
Electric Hoists—2 ton cap.
Osborn Hand Rollovers—Model 42

FOR THE BEST DEAL CALL
BALCHER MACHINERY COMPANY
695 E. 152nd STREET
CLEVELAND 10, OHIO
TELEPHONE: GLENVILLE 1-2474

LATE TYPE SAND SYSTEM

MUST BE SOLD NOW! MUST BE MOVED NOW!

24 station double hopper line, each 12 stations serviced by a separate LINK BELT TRU-TRAC rotary mold conveyor with Forty Four—20" x 47½" cars, automatic mold dumpers.

3 sections LINK BELT 36" Oscillating conveyor totaling 240', feeds dumped molds onto shakeout.

250'—42" apron casting sorting conveyor.

2 bucket elevators 34' and 62' high.

150 ton Sand hopper.

Flat belt sand conveyors.

Exhaust blowers.

2—Simpson # 3 UD Mullers, time cycle controls, dust hoods, cooling blowers and water meters.

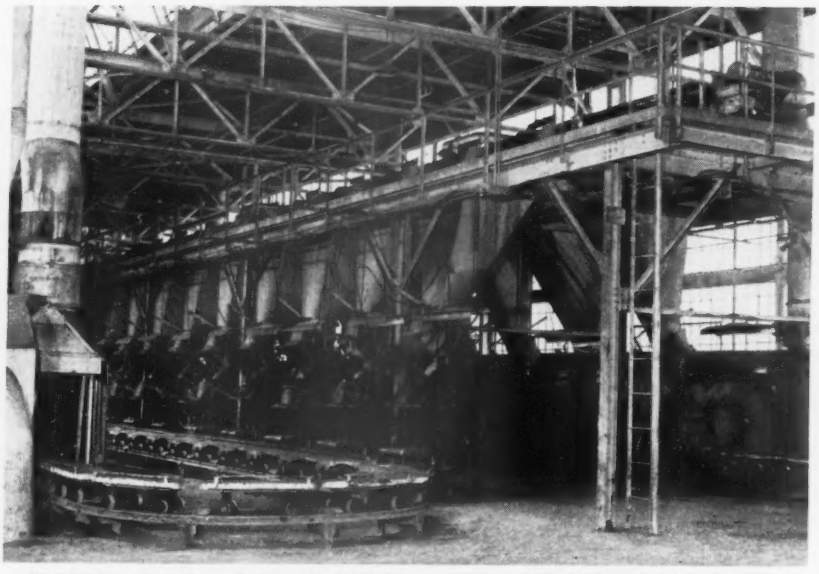
This equipment now located at Ashtabula, Ohio—Priced for sale before being dismantled.

THE ENTIRE LINE OR PIECE BY PIECE.

ACME EQUIPMENT COMPANY, INC.

126 South Clinton Street . . . . . Phone: A Ndover 3-3430 . . . . . Chicago 6, Illinois

RECENT PURCHASES



BUY ALL OR PART OF EITHER SAND HANDLING SYSTEM

27 STATION SAND SYSTEM

Consisting of:

2—SIMPSON No. 3 Style UD Sand Mullers with Air Cooling, Air Discharge Gates, Automatic Cycling and Control.
1—LINK BELT 100-ton Sand Bin.
2—LINK BELT 24″ x 20′ Flat Belt Conveyors, with Plows distributing to Sand Bin, with Motor & Reducer.
1—LINK BELT Sand Screen, on top of Sand Bin.
1—LINK BELT Prepared Sand Elevator, 24″ x 43″ casing, 16″ x 8″ buckets, 30′ high.
1—LINK BELT Cross-Over-Through Conveyor, 24″ x 90′, with Motor & Reducer.
1—LINK BELT Distributing Belt Conveyor 24″ x 175′, with Plows, operated from platform.
26—LINK BELT Molders Hoppers (13 on each side).
1—LINK BELT Mold Conveyor, with automatic dumping, car tops 20″ x 48″ 90 cars, 350′ Track, Cooling Tunnel, 4 Exhaust Vents (Used for one side of Hoppers).
1000′ MATHEWS 18″ and 24″ wide Roller Conveyor, heavy duty (Used on other side of Hoppers for Molds).
2—LINK BELT 5′ x 10′ Shakeouts (Used on Roller Conveyor lines for Shaking out).
1—LINK BELT 48″ x 200′ Leak Proof Hot Castings Sorting Apron Conveyor.
1—LINK BELT 24″ x 30′ Hot Sand Belt Conveyor with Magnetic Pulley.
1—LINK BELT Bucket Elevator, 60′ high, 16″ x 8″ buckets.
1—LINK BELT Sand Screen, to Sand Storage Bin.
1—LINK BELT 24″ x 25′ Belt Conveyor under Storage Bin.
1—Steel Sand Hopper, mounted on top of main hopper, motor driven.
2—KALAMAZOO #21 Motor Driven Exhaust Fans.
2—Motor Driven Dust Collecting Systems complete with Tank and Controls.
1—NATIONAL Aerator, V-belt motor drive and controls.
1—LINK BELT 30″ x 45′ Oscillating Conveyor, with motor drive and controls.
1—LINK BELT 30″ x 45′ Oscillating Conveyor, with motor drive and controls.
1—LINK BELT 30″ x 80′ Oscillating Conveyor, with motor drive and controls.
1—LINK BELT 30″ x 65′ Oscillating Conveyor, with motor drive and controls.

OVERHEAD SAND SYSTEM

Consisting of:

2—SIMPSON No. 3 Style C Sand Mullers, Serial No. 44018, 50 HP Enclosed Motors.
1—JEFFREY Sand Storage Bin, 60-ton capacity.
2—JEFFREY 48″ x 12′ Apron Conveyors, one under each Hopper, with Motors and Reducers.
2—Exhausters with motors, for each Muller.
1—JEFFREY Sand Distribution Belt, 30″ x 130′, Trough Idlers, Complete.
1—Bucket Elevator, 17″ x 37″ casing, 50′ high, 8″ belt, 7″ x 5″ buckets.

MISCELLANEOUS EQUIPMENT

1—MILWAUKEE #216 Jolt Squeeze Pin Stripper 21″ Dia. Squeeze cylinder, with roll-on & Roll-Off Attachments.
2—MILWAUKEE #165 Jolt Squeeze Pin Lift Machines 24″ x 34″ table, 8″ draw, squeeze cyl. 16″ dia.
1—MILWAUKEE #125 Jolt Squeeze Pin Lift Machine 21″ x 27″ table, 8″ draw, squeeze cyl. 12″ dia.
1—OSBORN #716 PJ Jolt Squeeze Pin Lift Machine 22″ x 34″ table, 7″ draw, 16″ squeeze cyl. dia.
1—OSBORN #560 Jolt Pin Lift Machine, table size 32″ x 45″ draw 12″, jolt capacity 2500 lbs.
2—SULLIVAN Model WG-9 Vertical Air Compressors, 40 Hp Size 8″ x 7″, CFM 232, with inter and after coolers. NEW 1951.
6—CARL MAYER 2 Compartment Batch Type Core Ovens Gas Fired, Re-Circulating I.D. 7′ Wide x 14′ Deep x 8′ high with L & N Controls, Swing Out Doors. LIKE NEW.
2—GEHNRICH Core Ovens, 18′ wide, 24′ deep, 9′ high, oil fired recirculating, with cars and all controls. New 1947.
1—TOCCO JR 20 kw Induction Heating Unit Single Station, 9600 cycles w/40 hp Motor.
1—BEARDSLEY & PIPER #30 Speed Muller, 3 cu. ft. Cap. w/20 Hp Motor.
1—SIMPSON No. 0 Sand Muller, 3′ Pan Dia. 175# Batch w/5 Hp Motor & Drive.
1—ROBBINS 8′ x 10′ Shakeout Model JF-11 Dual Unit. Cap. 16 Tons Per Unit w/2 20 Hp Motors. New 1948.
1—AMERICAN Wheelabrator, 48″ Dia. Swing Table. New 1952.
2—AMERICAN Wheelabrator, 26″ Continuous Tumblasts. New 1951, Never Used.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC RD. CLEVELAND 10, OHIO LI 1-6545

UNIVERSAL REBUILT EQUIPMENT GUARANTEED

AIR COMPRESSORS

COMPLETE STOCK—BURY, PENNSYLVANIA, SULLIVAN, INGERSOLL-RAND —SEND YOUR REQUIREMENTS

BLOWERS

25—CENTRIFUGAL, 16 oz., 2 to 5 HP
10—GE, WILBRAHAM-GREEN, FISHER Positive Pressure and Cent. Cupola Blowers

CLEANING EQUIPMENT

1—AMERICAN WHEELABRATOR TUMBLAST 1945, 48" x 72", with Skip Loader, Vert. bucket conveyor, motors & controls

1—AMERICAN WHEELABRATOR TUMBLAST, 48" x 48" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST, 42" x 48" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST 36" x 42" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST 20" x 27", w/rubber belt and Dust collector, plus new spare belt
1—PANGBORN TABLAST, 8' Table
1—PANGBORN ROTOBLAST, #BVR-5
1—PANGBORN ROTOBLAST, #28, Type GK
1—PANGBORN BLAST CABINET, #EP-5
3—TANNEWITZ METAL CUTTING BANDSAWS, 30" and 36"
1—CRESCENT METAL CUTTING BANDSAW, 30"
4—BURRING BENCHES, Magnesium cleaning, 9' L x 30" H x 30" W

CONVEYORS

1—LINK BELT, vibrating, double deck, 80' x 24", w/exhaust hood
1—LINK BELT, 21'6" x 24", with drive
1—LINK BELT, Car type mold, 114 cars, 403' track, car size 18" x 42"
1—JEFFREY, 3 compartment, ingot mold
4—SAND ELEVATORS, Various sizes
6—SAND BELTS, 10' ctrs. to 140' ctrs.
2500 FEET—FOUNDRY TYPE ROLLER CONVEYOR—ALL SIZES

CORE BLOWERS

2—DEMMLER #2, vert. or horiz.
1—DEMMLER #2A
1—DEMMLER #3K
1—DEMMLER #55, Late Model
2—OSBORN #91, #92
2—OSBORN #192, #193
1—CHAMPION CB-12
1—CHAMPION, Model CB-400
1—INTERNATIONAL SB-13
1—OSBORN Core Rollover, #136-3, (NEVER USED)

CUPOLAS

2—WHITING #5 complete with Skip Charger and Blower
1—MORRIS #9, Skip charger, Blower, Mixing Ladle, Never Installed
1—SKIP CHARGER for #9 Cupola with scale and buckets

DUST COLLECTORS

4—ROTOCLONE, #12, Type N, wet type
1—ROTOCLONE #14D w/Filter
1—ROTOCLONE, #16W
2—ROTOCLONE, Size 20D, Hopper type F
1—ROTOCLONE, Type W, 30" w/precleaner
1—PANGBORN, Style 635, 7800 CFM, 15 HP

1—AMERICAN DUSTUBE, #45 Bag Type

FLASKS

150 HINES AND FREEMAN ALUMINUM, Popoffs and Jackets
200 TRANSITE CORE PLATES, Various Sizes
SEND US YOUR REQUIREMENTS

FURNACES—DIRECT ARC MELTING

1—3,000#/hr. LECTROMELT 23,000 V
1—3 ton/Hr. "LECTROMELT", Top Charge
1—6 Ton/hr. HEROULT

FURNACES—INDIRECT ARC

1—350#/hr. DETROIT, Complete
1—1500# DETROIT ROCKER, Complete

FURNACES—INDUCTION MELTING

2—333 KW, AJAX-TAMA-WYATT, 1500# Alum., 60 cycle
1—30 KW, LEPEL
1—20 KW, AJAX SPARK GAP, High Frequency
1—6 KW AJAX
1—3 KW, AJAX, Lab type
1—75 KW Induction Melting Furnace complete with 200 lb. Furnace.
1—30 KW Induction Melting Furnace with 100 lb. Furnace.

Liquidation Sale

MINNEAPOLIS-MOLINE FOUNDRY
Louisville, Kentucky
Foundry Operated Only 9 Months
Partial listing of equipment:

MOLDING MACHINES
1—SPO 2148 Jolt Squeeze Strip
2—SPO 2136 Jolt Squeeze Strip
5—Osborn 275J Jolt Squeezers
5—Osborn 276J Jolt Squeezers
1—Herman 3,000 lb Jolt Rollover

CLEANING EQUIPMENT
1—Wheelabrator Tumblast, 48x48
1—Wheelabrator Rubber Belt Tumblast, 20x27
1—American Sand Blast Room 8'x8'x8', Table Type—with Collector

CUPOLAS
2—Modern No. 5 with Individual Skip Chargers, Holding Ladles, Blowers, Foxboro Controls and Charging Buckets

OTHER EXCELLENT EQUIPMENT
6—Modern Pouring Devices
2—Yale Electric Hoists 1 Ton
2—U.S. Electric 7½ HP Grinders, 20" Wheels with Torit Dust Collectors

FURNACES—GAS & OIL

1—FISHER MNP, Gas, Tilting, 1700# cap. Mag.
2—FISHER, Gas, Stationary, 4 Burner, 500# cap.
4—FISHER MNP, Oil, Tilting, with blowers, 500# cap. Alum.
4—FISHER MNP, Oil, with blowers, 1500# cap. Brass
3—FISHER, Oil, Stationary, model 125, type S, Brass
1—REDA, Gas #550
1—DEMPSEY, Reverberatory, 10,000#, 9' W x 14' L x 9' H, Oil
1—HAUSFELD, Tilting, 1200# capacity
1—HAUSFELD, Gas, Stationary, 1000#
1—HAUSFELD, Gas, Stationary, 70-80# Alum.
1—CAMPBELL-HAUSFELD, Gas, 100-125 Crucible
1—SKLENAR, Oil, 600# Cap.
1—STROMAN, Gas, Tilting, 1,000# cap. Alum., auto control, hyd. lift

MOLDING MACHINES

Jolt Rollovers

1—J & J #920RC
2—J & J #918
1—J & J #815, 30" x 40", 15" draw, 1200# jolt
2—INTERNATIONAL, 13 x 17" table, 6" draw
1—INTERNATIONAL, Type G, 24" x 10"
1—HERMAN 10,000#, 48" x 109" table
1—HERMAN 6000#, 42 x 78"
1—HERMAN 3000#, 30" x 66" Table
2—HERMAN 1500#
1—HERMAN 750#, 30" x 36"
1—OSBORN, 712 PJ, 18 x 28"
1—OSBORN #602, 36" x 26"
2—OSBORN #405-86, with levelling carriage
1—OSBORN # 405, 3,000#, flask size 64" x 50", 18" draw
1—OSBORN #333
1—OSBORN #332
2—OSBORN #243, 28 x 40", 20" draw
4—OSBORN #142, 15" x 20", hand draw
4—TABOR, 40 x 60", 2000 & 3000# capacity
1—TABOR, 30" x 40" with air clamps
3—TABOR 22" x 42", pattern draw, shockless, portable
1—TABOR, 20 x 30" w/air clamps, 1000#
2—TABOR, 14" x 16" Rockover
1—SPO ROCKOVER #506

Bumpers

1—OSBORN #102
2—DAVENPORT, 30" x 30" table
1—DAVENPORT, 24" x 27" table

Jolt Strippers

1—J & J, 30" x 24" table, 600# cap.
2—SPO #305, 20" x 27" table, 750# cap.
1—HERMAN, 22" x 30" table, #4317
1—TABOR, 20" x 20" table, hand strip
1—MILWAUKEE #1536, 32" x 38"
1—INTERNATIONAL 1255 PKL
1—OSBORN #559

Jolt Squeeze Strippers

1—OSBORN #175, 21" x 18", portable
2—MILWAUKEE #163

Jolt Squeezers

2—MILWAUKEE #105JS, 17 x 21", portable
8—SPO #110J, Portable
3—OSBORN #276-J, Cantilever
10—OSBORN #275-J, Portable
8—OSBORN #275PJ, Stationary
2—OSBORN #712PJ, Stationary
2—INTERNATIONAL, #12 LJS
4—TABOR, 3" Jolt, 17 x 20"

MULLERS AND MIXERS

1—SIMPSON #0, 3' Dia., 1⅓ to 1¾ cu. ft.
1—SIMPSON #1, 4' Dia., 4 cu. ft.
1—SIMPSON #2, Unit Drive, 6' dia., 14 cu. ft.
1—SIMPSON #3, 8' Dia., 25 to 30 cu. ft.
1—B & P SPEEDMULLER, #30, 3'10" dia., 3 cu. ft.
1—B & P SPEEDMULLER, #40, w/loader, 4'6" dia., 5 cu. ft.
1—B & P SPEEDMULLER #50, w/loader, 5'2" dia., 7½ cu. ft.
1—CLEARFIELD, #920, 9' Dia., 25-30 cu. ft.
4—BAKER PERKINS, #4A

LADLES AND POURING DEVICES

MODERN, SWINDELL, WHITING, TREADWELL—All Types and Sizes—Ready for your Needs!

OVENS

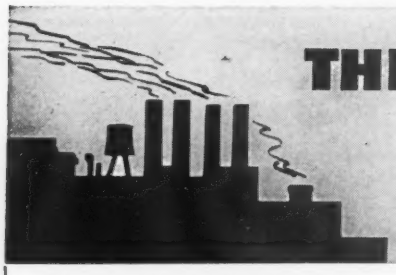
1—COLEMAN, Oil, one compartment, recirc., 60" W x 80" H x 14'6" L
FDY adv 530 5½pt CLEMENS 9-17—
2—ROSS, Gas, 2 compartment, recirc., rack type, 6½" x 14' x 7'
1—YOUNG BROS. elec., 3 compartment, Kiln type
3—GENRICH, elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L

SAND CONDITIONING

3—B & P SCREENERATORS Model L, M and S
1—ROYER PREPARATOR, Comb. Model RC, 40 Ton/hr. Scrap removal, 9' x 9' hopper
5—ROYER, NB-2, 12" Belt
1—ROYER SAND BLENDER, 12" belt
1—JEFFREY SANDITIONER, PORTABLE

UNIVERSAL MACHINERY AND EQUIPMENT CO.

1630 N. Ninth St., Reading, Pa. **Phone 3-5103**



THE ACME *bargain page*

AIR COMPRESSORS
Ingersoll Rand Type 10, 800 CFM, 2 stage air compressor, 200 HP, 220 V motor. Rebuilt 1952.

BLOWERS
Ingersoll-Rand Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220V G. E. Induction motor.
General Electric 7500 CFM, 20 oz., 89.6 Max. HP, 220V motor, Airway controls.
Ingersoll-Rand turbo compressor 10500 CFM @ 20 oz. 85 HP G. E. 220V 3500 CFM motor.
2—Whiting-Allis Chalmers Turbo. 5750 CFM 28 oz. 60 HP 440V air pressure

CONVEYORS, VIBRATING
Os-A-Veyor 2—24″ x 24″ section with 6′ grizzley

CORE BLOWERS
3—International SB 12.
4—International SB 13.
10—Osborn 193.
1—Osborn 2035-2.
1—Champion CB 400.
2—CB 10 Late Type.

CORE GRINDERS
4—Milwaukee 70-9.

CORE OVEN VERTICAL HORIZONTAL
1—Coleman, combination oil or gas fired 43 carriers 24″ x 90″—1 hour 12 min. to 4 hours 48 min. cycle.
1—Coleman, combination oil or gas fired 43—2 shelf carriers 30″ x 144″ long. 2 hour 12 min. to 7 hour 24 min. cycle. Present replacement cost over $90,000.

CORE PASTE OVENS
2—Coleman Gas Fired 28′-25″ x 42″ opening.

DUST COLLECTORS
Rotoclone 24W, 30 HP
Pangborn CH2, 5 HP

ELECTRIC MELTING FURNACES
Detroit Electric 1500#—Kuhlman 13200 volt transformer complete with controls.
Detroit Electric 350#—Kuhlman 13200 volt transformer and controls.

FURNACE TRANSFORMERS
We have Electric Furnace Transformers in stock from 800 KVA to 2500 KVA. Write us your needs.

GRINDERS
Horizontal Disc (Flat) Grinders:
Gardner #186, 30″ dia. disc. 10 HP, 220/440V, with dresser, wet or dry grinder.
Double End Disc:
1—U.S. 18″ wheels, 2 swing tables.

GRINDERS, SNAGGING
2—Hammond 10 WRI D. E. Snag. 20″ dia. wheels, 10 HP 220/440 v motors, variable speed drives.
1—3″ x 24″ U.S. #65, 20 HP 220/440V.

GRINDERS, SWING FRAME
2—3″ x 24″ x 12″ Fox #4, 15 HP.
1—3″ x 24″ x 12″ Marschke, 20 HP.
1—3″ x 24″ x 12″ U.S. 15 HP.

HOT METAL CARRIERS
3—1 ton D.C. Cab operated Cleveland, Monotractor Hot Metal Carriers.

MOLDING MACHINES
Jolt Squeezers:
5—Milwaukee 103-11 Staty. Jolt Squeezers, 13½″ x 20″ table.
7—Champion JS10P Portable Jolt Squeeze molding machine, 18″ x 21″ table.
4—Osborn 275J.

Jolt Squeeze Pin Lifts
2—Milwaukee Jolt Squeeze Strippers, Model 163-50, 15″ x 24″ table 16″ X open end pattern size.
1—#165 Milwaukee.
10—712 PJ Osborn

ROLLOVERS
1—Herman 4000# Series 30″ x 60″ table.
1—Herman 3000# Series 40″ x 84″ table, special slotted table.
1—Herman 1500# Series 20″ x 36″ table.
2—Herman 750# Series 20″ x 30″ table.
2—Herman 750# Series 20″ x 24″ table.
3—Spo Model 9032.
1—Milwaukee 217.
2—International Type G, Portable, 20″ x 8″ draw.
3—Tabor Portable Rollover 30″.
Johnson & Jennings 1020-44 x 44 max. Flask Size.

PIN LIFT PUSHOFFS
1—Champion Pin Pushoffs 28″ x 42″ table 10″ draw.

MULLERS
Simpson 1 H
Simpson #2 Unit drive

OVENS, CORE
Despatch Type S, 2 cars 27½ x 54 x 64, Gas Fired.

OVERHEAD TROLLEY CONVEYORS
5000′ Jervis B. Webb & Link Belt 658 chain, 4 D.C. motor drive and MG set.

POURING DEVICES
3—Pouring devices, Whiting 500#.

ROTOBLAST
Pangborn 6′ dia. 6LF14 with dust collector

SAND SLINGER
B & P Motive Jr. Slinger 19″ 2 speed head
B & P Stationary, 16″ head

SAND CONVEYORS
144′-30″ Flat with Drives.
47′-30″ Trough with Drives.
2—Simplicity Os-A-Veyor 24″ x 24′

TUMBLING BARRELS
3—Royersford 42′ x 72′ Roller Bearing, Chain Drive.
1—Sly Square 42 x 42 x 64.
1—Sly 42″ Dia. x 56″.

WIRE STRAIGHTENERS
American type F Rod Straightener
Climax 2A

WHEELABRATORS
1—27″ x 36″ Rubber Belt Wheelabrator
48″ x 42″ American, bucket loader

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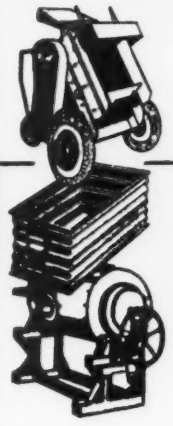
MONA



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COMPLETE MECHANIZED SAND HANDLING SYSTEM . . . NEW IN 1951

We are selling the equipment of the

MOHAWK FOUNDRIES

subsequent to their moving to a new location from the present address of:
3750 VALLEY ROAD, CLEVELAND, OHIO

SAND DISTRIBUTING CONVEYOR—18 STATIONS
. . . SHAKEOUT AND SAND CONVEYOR . . .
VIBRA SCREEN—PUG MILL BUCKET ELEVATOR.

CALL NOW! SEE IN OPERATION

GLenville 1-1222

Shot Blast Equipment: Pangborn type MTS Cabinet with Table and Pangborn Type EN-2 Cabinet
Molding Machines: Squeezers, also 4—#405 Osborn Rollovers and 3—#2047 Osborn Rollovers
Core Oven: 2-Door Despatch—Gas Fired with Controls 2—400 Ton Kux Zinc Die Casting Machines . . . Saws—Grinders—Welders

We Buy and Sell One Piece of Equipment or Complete Foundries—Everything Guaranteed

CORE OVEN

1—Steiner Ives Co., gas fired, recirculating, Wheelco Controls, 88" wide x 48" deep, 7' high, 4 horizontal counterweight doors.

ANNEALING FURNACE

Loftus Engineering, Pusher type, gas fired, recirculating complete with all controls overall dimensions: 45' lg. x 10' wide x 12' high

TUMBLING MILL:

60" x 72" Ransohoff tumbling type wet cleaning mill, Serial No. 6318, drive 15 HP. bucket loader 5 HP 3/60/220

MAGNESIUM CLEANING CABINETS:

7—Whirlpool Duplex, 800 CFM, 100" wide x 65" deep x 90" high. Buffalo exhausters—7½ HP., 220/440

MOLDING MACHINE SPECIALS

OSBORN

Rollovers:
1—Model 405-95, 40"x60" table, 26" draw, 3500 lbs.
2—Model 602, 24"x36" flask, 10" draw.
6—Model 601-13, 24"x30" flask, 10" draw.
8—Model 2047-4, 8" draw, adj. air clamps.
1—Model 422, 9" draw, 26"x36" flask.
4—Model 242, 12" to 19" draw, 24"x54" flask.
1—Model 342, 12" to 19" draw, 24"x54" flask.
1—Hand Rollover and draw, 12"x15" table.
1—Model 36 core draw, 6" lift, cap 100#.
1—Pushoff, 3'x16' table.
1—2042 Jolt Squeeze Rollover and Draw.

Rockover and Draw
1—147-1, air clamps 8" draw, 40"x24" core box.

Jolt Squeeze Pin Lift
4—814-P, 700 lbs. joint, 8" draw, 14" squeeze cylinder.
5—720U, 600 lbs. jolt, 4" draw, 11" squeeze cylinder.
2—724 PJ, 24" cyl., 11" jolt cyl. table, 10" draw.

Joint Pin Lift
2—559 Portable 25"x30" table, 1200# jolt, 6" draw.
2—559HD Stationary 25"x30" table, 1200# jolt, 6" draw.

INTERNATIONAL

Rollover
2—Type G, 1000# capacity, 10" draw, size 24"x10".
6—Type RJ air jolt, hand rollover, size 20"x8".
4—Type R hand ram, hand rollover, size 20"x8".
1—Type PK-10 Jolt Squeeze Pin Lift, 10" squeeze cyl., 8" lift.
1—Type J, 76"x76" table, 10,000 lb. cap., plain jolt.
1—Type J, 18"x18" table, 700 lb. cap., plain jolt.

NICHOLS

Jolt Squeeze Strippers:
2—Model 24-54D, 24" squeeze piston, 1600 lbs. jolt, 8" draw.

Jolt, Frame Strip:
4—Model 16-JS, 16" jolt cyl., 12" draw, 2-8" draw cyls.

MILWAUKEE

Jolt Squeeze Strip
1—165-2, 24" x 30" table, 8" draw, 16" squeeze cyl.
1—163-65, 15" x 24" table, 8" draw, 16" squeeze cyl.

Jolt Pin Lift
1—62OND2 Frame Strip Pushoff, 2000 lb. capacity.
2—900 lbs. jolt, pin lift, 6" draw, 17" x 21" table.

TABOR

Rollovers
1—22" x 42" table, 10" draw, 600# cap., air clamps.
2—22" x 32" table, 10" draw, 600# cap., air clamps.
2—Plain jolt B-4, 18" x 24" table, 700# capacity.
3—Plain jolt B-3, 12"x 14" table, 300# capacity.

SPO

Jolt Squeeze Rollover and Draw
1—917—750# jolt, 17,000# squeeze cap., 9" draw.

Jolt Squeeze Pin Lift
2—2136, 800# jolt, 10,000# squeeze, 6" draw.
2—2138, 800# jolt, 10,000# squeeze, 8" draw.
3—2166, 1500# jolt, 16,000# squeeze, 6" draw.

Jolt Pin Lift
3—3070, 1500# jolt, 10" draw, 26" x 35" table.
2—307, 1500# jolt, 8" draw, 25" x 30" table.

Jolt Rockover and Draw Stationary
2—508, 28" x 30" table, 1200# jolt, 9" draw.

DAVENPORT

Rollovers:
1—Model SA40, 18" draw, 3000# cap., 40" x 60" table.
7—Model SA28, 12" draw, 1500# cap., 30" x 40" table.

JOHNSTON & JENNINGS

Rollovers:
1—Model 612, 24" x 30" table, 600 lbs. cap. 12" draw.
5—Model 918, 44" x 54" table, 2000 lbs. cap., 18" draw.
1—Model 610, 24" x 30" table, 600 lbs. cap., 12" draw.
4—Model 815.
2—610RP table size 24" x 30", 10" draw, 600# jolt.
4—815 table size, 30" x 40", 15" draw, 1200# jolt.

Jolt Pin Lift
1—1216—36" x 54" table, 3000 lbs. jolt, 16" draw.

FOR SALE NOW: In Bellville, Ohio, 10 miles south of Mansfield a complete Gray Iron Foundry with No. 7 Whiting Cupola, 18,000 sq. ft., with railroad siding.

ACME IS NOW LIQUIDATING

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PARK and FIRST STREETS

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ONE OF THE EAST'S LARGER PRODUCTION FOUNDRIES OVER 200,000 SQUARE FEET FILLED WITH GOOD FOUNDRY EQUIPMENT

Everything must be sold!

The building must be prepared for other uses as quickly as possible!

The following is a partial list of the thousands of items offered for sale—Send for our more complete list or better yet come over and see for yourself!

2—Whiting #10 Cupolas
2—Whiting #9 Cupolas
2—14000 C.F.M. 40 oz. Cupola Blowers
1—Simpson #3 Muller
1—B. & P. #70 Muller
1—B. & P. #60 Muller
4—Mold Conveyors—1 with 48″ x 84″ cars
3—Synchronous Air Compressors up to 300 H.P.
30—Molders hopper system
28—Molding Machines—Nichols, Milwaukee, Osborn, Davenport
2—40 H.P. Slingers
2—25 H.P. Slingers
2—Slinger Turntables
8—Shakeouts
65—Air Hoists
6—Core Grinders
6—Fox Single Wheel Grinders
10—Core Blowers
4—Wheelabrators
5—Tumbling Barrels
Laboratory Equipment
Complete Pattern Shop

Ladles, 200 ton flasks, air tools, yard switching engine, monorails, trolleys, bridge cranes, core plates, chaplets, foundry supplies and alloys, thousands of feet of flat and troughing sand belt conveyors, thousands of feet roller conveyors, and other items too numerous to mention.

Please write for our illustrated circular.

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COMPLETE FOUNDRY

Must Sell Immediately Over

$1,000,000 EQUIPMENT

Buildings are sold . . . Must sell equipment

Over ONE MILLION DOLLARS spent in last 2 years to mechanize and modernize on Brand New Equipment. This Equipment Must Be Sold!

Largest . . . Most Modern . . . Completely Equipped . . . Malleable Foundry in Eastern United States is forced to LIQUIDATE at LOW LOW prices.

Following are a few of the excellent values you will find.

NATIONAL ENGINEERING TRAIN TYPE AUTOMATIC MOLDING UNIT

Including: 1—#3F Muller.
22 Station Overhead Sand System.
3—36" Simplicity Oscillating Shakeout Conveyors.
1—#458 Hot Casting Chain Conveyor.
2—3 Unit National Train Conveyors.

This system is complete with all distributing belts, bucket elevators, molders hoppers, main storage bin, dust collector, and accessories to make this a complete system. THIS UNIT WAS OPERATED ONLY 2 YEARS!

MELTING UNIT

Consisting of: 2—#5 Whiting Cupolas with automatic monorail charger, with Foxboro controls and blower, discharging into a Whiting Air Furnace.

This Melting Unit is in excellent condition—IN OPERATION ONLY 2 YEARS!

OTHER DOLLAR SAVING VALUES INCLUDE:

4—Wheelabrator Tumblasts.
2—Beardsley & Piper Mulbaros.
50—Osborn 275 PJ Molding Machines.
1200 ft. Cleveland Tramrail with hoist and pouring units.
2—Complete Core Rooms.
1—#2 Simpson Muller.
Ladles of all sizes.

Look over our equipment . . . Tell us what you think it is worth . . .

Any reasonable offers will be considered.

This "once-in-a-lifetime" sale is within walking distance of the Newark Airport. Phone us COLLECT . . . We will meet you at the airport and take you to this exceptionable sale of excellent machinery.

This Is Definitely Your Golden Opportunity To Save Money.

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AIR COMPRESSORS

1—CHICAGO-PNEUMATIC Size 7½ x 6 Single Stage horizontal, 20 HP Motor, Starter etc, 220/440 volts.
2—GARDNER-DENVER Model ADR, 4" stroke, 15 HP Motor & electrical 220/-440/3/60 cycles 125 PSI pressure, w/-storage tanks. New in 1950's.
1—SULLIVAN Type WN-3 size 20" x 12" x 14", 1220 CFM, 250 HP. AC Motor.

AIR HOISTS

10—INGERSOLL-RAND, Size C 2000 lb.
75—INGERSOLL RAND RC-5, 500 lbs.
3—INGERSOLL RAND Size "AN" 500 lbs.
6—INGERSOLL RAND Size "EN" 1000.
15—DETROIT, 1 and 2 ton cap.
15—APPLETON air hose reels, swivel base, 50', and 75 capacities.

ELECTRIC HOISTS

1—Comet 1000 lbs. capacity.
1—SHAW Box 1000 lbs. capacity.

BUCKET ELEVATORS

1—LINK BELT 30' Centers, 10" x 7" Buckets, w/Motor and Drive.
1—LINK BELT 35' Centers, 12" x 7" Buckets, w/Motor and Drive.
1—LINK BELT 50' Centers, 16" x 8" Buckets, w/Motor and Drive.

CUT-OFF MACHINES

1—DEWALT model ME2 cut-off saw, 10 HP motor, 24" Carboloy blades.
1—GROB Band Saw, Type OS-36, open end, 36" throat. MD.
3—TESSMER "I" Sprue Cutters.

CORE WIRE AND ROD STRAIGHTENERS

1—AMERICAN Type D Pneumatic Rod Straightener and Shear, 1¼" capacity.
1—CLIMAX #3, ¼" to ¾". Length 10".
2—KANE & ROACH Model DX-5.

CORE GRINDERS

2—MILWAUKEE Rotary Type, Model 70-12, 70" Dia. Table. Very Late.
1—STONEY core grinder, 16" dia. wheel, 48" travel, 5 HP AC motor.

CORE BLOWERS

2—CHAMPIONS CB 10, Max. Core 10 lbs.
2—CHAMPIONS CB 400, Max. Core 300.
1—DEMMLER No. 1, Max. Core 10 lbs.
2—DEMMLER No. 2K, Max. Core 20 lbs.
2—DEMMLER No. 2E, Max. Core 20 lbs.
2—DEMMLER No. 2, Max. Core 20 lbs.
2—DEMMLER No. 3, Max. Core 35 lbs.
2—DEMMLER No. 3K, Max. Core 35 lbs.
2—DEMMLER No. 3E, Max. Core 35 lbs.
1—DEMMLER No. 4, Max. Core 100 lbs.
1—DEMMLER No. 4E, Max Core 100 lbs.
2—INTERNATIONALS No. SB, 11 Max. Core 15 lbs.
2—INTERNATIONALS No. SB 13, Max. Core 30 lbs.
2—OSBORN No. 92, Max. Core 35 lbs.
2—OSBORN No. 192, Max. Core 50 lbs.
2—OSBORN No. 193, Max. Core 75 lbs.
6—MILWAUKEE TACCONE Model A-3, Max. Core, 4 lbs.
1—DEMMLER No. 50.
2—REDFORD No. 1 Bench Type.

CORE KNOCKOUT SYSTEM

Consisting of: Simplicity 3' x 8' Shakeout, 24" x 60' Belt beneath Shakeout, Inclined Belt 24" x 105' with 18" x 24" Dings Magnetic Pulley & MG Set, Jeffrey 24" x 20" Double Roll Crusher, & 25 Ton Capacity Storage Bin.

CORE OVENS

1—INDUCTION Heating Dialectric Model M-800A, 600 lbs. per Hr. New.
1—INDUSTRIAL "Revolving Carriers" Continuous, Trays 18" x 80", Gas Fired.
1—MAEHLER SINGLE COMPARTMENT I.D. 96" L x 80" W x 84" High, Gas Fired Recirculating, L & N Controls.
2—DIETERT #500 LAB DRYING TYPE.

CUPOLAS, BLOWERS & ACCESSORIES

1—WHITING No. 7 Cupola, with Loader, Controller, Motor and Blower.
1—ROOTS CONNERSVILLE, Size 20 x 44, 7000 CFM, Type HD, 50 HP Motor.
4—LINDBERG Centrifugal Blowers 2100 CFM, with 15 HP Motors.
5—WHITING 42" Dia. Charging Buckets.
1—I & R Single Stage FS-367, 100 HP, 9400 CFM.
2—WHITING No. 9 Cupolas with I & R FS-357 Blowers 50 HP, NEW 1944.
2—I & R Type FS 365 Turbo-Blowers, 50 HP, 8150CFM.
1—WHITING 150 HP Centrifugal Blower, 12,800 CFM with Foxboro Air Weight Controller.

DUST COLLECTORS & ROTO-CLONES

1—AMERICAN AIR FILTER No. 20, Type N Rotoclone Dust Collectr, Arrangement C, with sludge ejector.
1—AMERICAN Air Filter No. 12, Type W, arrangement "C," with Sludge Ejector.
1—AMERICAN Air Filter No. 14, Type W, arrangement "C," with Sludge Ejector.
1—AMERICAN Air Filter No. 27, Type W, arrangement "C," with Sludge Ejector.
2—AMERICAN Air Filter Type N, Size 10 with Bench. For Grinding.
1—AMERICAN Air Filter Type N, Size 24, 24,000 CFM, 75 HP Motor.
3—AMERICAN AIR FILTER Type W, Size 30, Arrangement "C." with Sludge Ejector.

ELECTRIC ARC MELTING

2—AJAX #500 Nose Tilt Furnaces, 3000 cycle. Used with Induction MG Set.
1—AJAX #300 Nose Tilt Furnaces, 3000 cycle. Used with Induction MG Set.
2—DETROIT Rockers, Indirect Arc. Type AA, 750-1000 lbs. capacity. Complete with 200 KVA Transformers, Control Panels, Automatic Electrode Holders.
2—DETROIT Rockers, Indirect Arc, Type AA, 1000-1500 lbs. capacity. Complete with 358 KVA Transformers, Control Panels, Automatic Electrode Holders.

GAS & OIL FIRED FURNACES

2—LINDBERG-FISHER Model MNP, Size 300, electric tilt, with motor and blower.
6—LINDBERG FISHER Model MNP, Size 1700, Electric Tilt, Motor & Blower.
3—LINDBERG FISHER Model MNP, Size 2400, Electric Tilt, Motor & Blower.
2—LINDBERG FISHER, Type BB1, Size 225, Hand Tilt, with Motor & Blower.
12—LINDBERG FISHER, Model SSH, Size 550, Stationary, Motor & Blower.
6—LINDBERG FISHER, Model SSH, Size 150, Stationary, Motor & Blower.
3—LINDBERG FISHER, Model SSH, Size 60, Stationary, Motor & Blower.
10—CAMPBELL HAUSFIELD, Stationary, Size 125 to 250, Motor & Blower.
2—CAMPBELL HAUSFIELD, Model 1PNT, Size 2000 lbs., Electric Tilt, with Motor & Blower.
1—LINDBERG-FISHER Type BBI, Size 1000 Crucible, Hand Tilt Gas Fired w/Motor & Blower.

GRINDERS—SWING FRAME

1—MARSHKE, 12" x 2", 3 HP.
1—MARSHKE, 20" x 10", 10 H.P.
2—FOX, No. 6, 24" x 10", 15 H P.
1—MARSHKE 24" x 10", 15 HP motor.

GRINDERS—SNAGGING

2—U. S. ELECTRICAL, No. 64, 20" x 3" Wheel, 7½ HP, 4-Speeds.
1—HAMMOND, Model WR-1, 24" x 3" x 12" Wheel, 10 HP.
2—SAFETY RITES, No. 174, 24" x 3" x 12", 10 HP.
2—MARSHKE Model LGZAH 24" x 4" x 12" Wheel, Double End 20 HP Multiple

GRINDERS—DISC

1—BEASLEY #372 Vertical Spindle Dry Grinder, 53" dia., 20 HP. New 1952.
1—QUEEN CITY, Model 100 Double End, wheel size 20" x 2" x 2", with 10 HP
1—U. S. ELECTRIC, No. 80, Double End, Wheel size 16" x 3", with 7½ HP Motor.

HEAT TREAT FURNACE

2—LINDBERG, Model 4860 GH, Gas Fired 48" x 60", Recirculating, with L & N Controls to 1250° F.
1—LOFTUS ENGINEERING CORP. Annealing, Walking Beam Type, Gas Fired, 1600°, Recirculating, 10' x 12' x 40'.

LADLES

12—MODERN pouring devices, Models F-9 and FA-9, with tapered covered ladles. 400 to 800 lbs. capacity.
3—WHITING Cylindrical, 275 lbs. 19" x 26".
2—MODERN Cylindrical, 1500# 29" x 30".
1—MODERN mixing, 44" x 44", on wheels, 4000 lbs.
2—STEVENS Cylindrical, 2450 lbs. 29½" x 41½".
9—WHITING Lip Pour, 1200 lbs., 23" x 23".
6—MODERN Lip Pour, 1600 lbs. 24" x 24".
2—WHITING Lip Pour, 2000 lbs. 29" x 29".
2—WHITING Lip Pour, 7000 lbs., 41" x 41".
1—WHITING Lip Pour, 8000 lbs., 44" x 44".
1—WHITING Lip Pour, 10 ton 62" x 62".
1—WHITING teapot, 4000 lbs., 32" x 32".
1—WHITING Lip Pour, 40 ton capacity.
7—WHITING Bottom Pour 48" x 48", 4 Ton Cap.
1—WHITING Lip Pour 20 Ton Capacity.
1—MODERN 3 Ton Cylindrical Mixing Type, Electric.

MOLDING MACHINES

JOLT SQUEEZERS

2—MILWAUKEE No. 104, 10" cyl., portable.
2—MILWAUKEE No. 123, 12" cyl., stationary.
6—MILWAUKEE No. 181, 18" squeeze cyl. 24" x 36" table.
8—OSBORN No. 275 JW, Straddle Type 10" Cyl., Portable.
16—OSBORN No. 275J, 10" Cyl., Portable.
3—OSBORN No. 276J, 12" Cyl., Portable
6—OSBORN No. 210 PJ, Swing Back Head. 10" Cyl., Stationary.
6—OSBORN No. 212 PJ, Swing Back Head. 12" Cyl., Stationary.
1—CHAMPION No. JS-10-P, 10" Cyl., Swing Back Head, Portable.
20—SPO No. 110J, 10" Cyl., Portable.
6—TABOR 10" cyl. portable and stationary

JOLT ROLLOVER PATTERN DRAW

1—DAVENPORT model 24SA, 24" x 30" table, 12" draw, 1200 lbs. capacity.
1—DAVENPORT No. 28 SA, 29" x 40" table, 1500 lbs. cap., 12" draw.
1—DAVENPORT No. 34 SA, 34" x 48" table, 2500 lbs. cap., 15" draw.
1—DAVENPORT No. 28R, 34" x 48" Table. 12" Draw.
2—DAVENPORT No. 40-SA, 42" x 50" Table, 3000 lbs. Jolt, 18" Draw.
1—HERMAN #6000 Series, 42" x 78" Table, 6000 lbs. Jolt Cap., 20" Draw.
1—HERMAN #1500 Series, Table 26" x 30", Jolt 1500 lbs.
2—HERMAN Hi-Speed Jar, 1500 lb. series. 26" x 48" table.
1—HERMAN #750 Series, Table 20" x 30" 750 lbs. Jolt.
2—HERMAN #4000 series, 40" x 60" table, 13" jolt cyl.; 4000 lbs. cap.
6—INTERNATIONAL "R" Core Rollovers.
1—INTERNATIONAL "G" Size 20" x 8".
1—INTERNATIONAL "G" Size 24" x 10".
1—INTERNATIONAL "G" Size 30" x 12".
1—INTERNATIONAL RES. Size 15" x 8".
1—INTERNATIONAL Type "F." 31" x 54". Draw 16". Jolt Cap. 2500 lbs.
4—JOHNSTON & JENNINGS model 918, 44" x 54" table, 20" draw, 2000 lbs. cap.

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1—MILWAUKEE #167, Table 32" x 33", Draw 12", Jolt 1000 lbs., Sq. Cyl. 16".
1—MILWAUKEE 217 table 35" x 41", sq. cyl. 16", draw 12", jolt 1200 lbs.
1—MILWAUKEE Model 60B-3, 60" flask, 18" draw.
10—OSBORN No. 40 and 42, Hand Core Rollovers, 18" x 8" Draw.
1—OSBORN No. 342, Table 23" x 38", Draw 10", Jolt 1000 lbs.
1—OSBORN No. 442, Table 21" x 31", Draw 10", Jolt 600 lbs.
1—OSBORN No. 242W, Table 29" x 42", Draw 19", Jolt 1500 lbs.
2—OSBORN No. 405, Table 57" x 64", Draw 26", Jolt 3000 lbs.
6—OSBORN No. 601, 30" wide Flask, 10" Draw, 750 lbs. Jolt.
6—OSBORN No. 602, 36" Wide Flask, 10" Draw, 750 lbs. Jolt.
2—OSBORN No. 332, Flask Size 26" x 36", Draw 9", Sq. Cyl. 16", 1500 lbs. Jolt.
1—SPO No. 413D. Table 24" x 25", Draw 10". Jolt 600 lbs., Sq. Cyl. 13".
1—SPO model 506, portable, 24" x 30" table. 10" draw, 600 lbs. capacity.
3—TABOR, Size 30" x 40" Table 12" Draw 1000 lbs. Jolt Cap. Stationary.
4—TABOR, Size 22" x 32". Draw 10", Jolt 600 lbs.

JOLT PIN LIFT

2—DAVENPORT model 24 AJS, 24" x 30" table, 8" draw, 1000 lbs. capacity.
2—MILWAUKEE Model 2542, 38" x 42" table, 12" draw, 3000 lbs., jolt cap.
2—OSBORN No. 559, Table 25" x 30", Draw 6", Jolt 1200 lbs.
1—OSBORN No. 563, Table 55" x 63", Draw 12", Jolt 7000 lbs.
1—SPO #3058—22" x 28" Table 8" Draw. 750# Jolt Cap.

PIN LIFT

1—INTERNATIONAL Model LP 6, 8" draw, 750 lbs. cap.
1—INTERNATIONAL LP 10, 30" x 30" flask, 1000 lbs. cap.
2—MILWAUKEE No. 620 ND, 24" x 30" table, 2000 lbs. cap.

JOLT SQUEEZE PIN LIFT

1—INTERNATIONAL PKL, 12" Squeeze Cyl., 6" Draw.
1—MILWAUKEE No. 163, Table 15" x 24". Draw 8", Jolt 1500 lbs., Squeeze Cyl. 16".
2—OSBORN No. 710J Table 17" x 21", Squeeze Cyl. 10".
1—SPO 2114, table 20" x 27", 4" draw, 600 lbs. jolt, 11" cyl.
1—SPO 2146, table 21" x 31", 6" draw, 14" cylinder, portable.
1—SPO 2136G, table 19" x 26", 6" draw, 13" cyl. portable.

JOLT (BUMPERS)

1—HERMAN, 40" x 60" Table, 13" Cyl. 6000 lbs. Jolt.
1—TABOR, Table 30" x 40", 2800# cap.
1—HERMAN 8' x 12' Table, 20" Cyl, 10,000# Jolt.

MATERIAL HANDLING EQUIPMENT

3—HOUGH Model HA Payloader Hydraulic Lift, 12 cu. ft. cap. bucket.
1—BLAW-KNOX ½ yard clamshell bucket, single line.
1—INGERSOLL RAND, Size MHU, Air Winch, 2000 lbs. Cap.
6—LEWIS SHEPPARD Platform Hand Lift Trucks (For Core Room).
1—LINK BELT car puller, #5 capstan.
1—HOUGH Model HA Payloader hydraulic lift, 12 cu. ft. bucket, w/torque converter drive, New 1955.

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24" wide, either flat or trough idlers, Timken bearings, take-ups, motors and speed reducers, any designated speed. All material used, with exception of steel.

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1—LINK BELT 36" x 100' centers, motor and drive.

VIBRATING CONVEYOR

1—LINK BELT Model PA 36" x 40' Oscillating Conveyor, with 5 HP Motor. Used less than 6 months—LIKE NEW.
3—SIMPLICITY Model OA-10-A, 36" x 15'.

OSCILLATING CONVEYOR

1—LINK BELT 48" x 154'.

ROLLER CONVEYOR

800'—MATHEWS 22" Roller Conveyor, 2¼" Dia., 6" centers, 4" channel iron, complete with stands. LIKE NEW.
200'—MATHEWS 6" Roller Conveyor, 2⅛" dia., 3" centers, 4" channel iron. Heavy Duty.
500'—MATHEWS 48" Wide Rollers, 5" Dia., 1½" shaft, 12" centers, on 6" channel.
1300'—MATHEWS 16"-18", 24" & 30" Wide Rollers, 2 9/16" Dia. 4" centers. 1 1/16" shaft.

CHAIN CONVEYOR

500' JARVIS No. 678, complete with drives.

UNDER CAR UNLOADER

6—FARQUHAR, 18" x 30', w/3 HP Motors.

TRAMRAIL

3—LOUDEN MONORAIL SYSTEMS, "Super Track"
(1) 110' of 6" I-beam & two 20' bridges
(2) 140' of 6" I-beam & two 12' bridges
(3) 130' of 11" I-beam & two 30' bridges: All Complete.
1—AMERICAN TRAMRAIL system with (1) 1 ton 20' span underslung bridge, and 150' of 12" tramrail, with air reels.
4—AMERICAN TRAMRAIL 2 ton cap. 20' span underslung bridge cranes.
2—AMERICAN TRAMRAIL 4 ton cap. 20' span underslung bridge cranes. Chain gear travel, complete.

OVERHEAD CRANES

1—WHITING 5 ton Overhead Crane, 50' span. Cab Operated, AC.

MOLD DRYERS

1—PORBECK Mold Dryer, 42" wide, 8' long, oil fired, Serial No. 242.

MOLD CONVEYOR

1—WEBB 109 Cars, Car Tops 32" x 39".

SAND MULLERS

1—BEARDSLEY & PIPER No. 50 Speedmuller, with Loader and Dust Hood, 50 HP Motor.
1—LINK BELT 48" x 8' Paddle Type.
1—BAKER PERKINS No. 16½, 30 HP.
1—CLEARFIELD, #610 Batch, 6 Cu. Ft.
2—SIMPSON, #1 Style B, Single Wheel, 400# Batch.
1—SIMPSON, #3 Style C, Enclosed Gears —3000#.
1—SIMPSON #2, Style UD, 1500 lbs. Batch. With Loader.
1—SIMPSON, #2, Style C, 1500 lbs., with Loader. Enclosed Gears.
1—DRAVO-DOYLE 6 Cubic Feet Capacity Wonder Model, portable, 5 HP 220-440.

SAND PREPARATORS

6—ROYER Sand Conditioning Units, consisting of:
(1) 1' x 5' Royer Shakeout
(1) Farquhar 18" x 30' Conveyor underneath Shakeout
(1) Royer Model NDS Sand Preparator.
6—B & P Screenarators, Models S, M & L.
1—PEKAY Aerator, Model 320-3. (For Sand System).
8—ROYERS, Models NDP-C-2, NC-4, NDS.

SAND CUTTERS

1—AMERICAN Model AA 5'2" Blade.
2—AMERICAN Model M, 79/60.
1—AMERICAN, Model M-Size 99/80.
1—AMERICAN, Model M-Size 89/70.
1—AMERICAN SandMaster 72"/102".

SAND SLINGERS

2—JEFFREY Swivel type Flask Filler Booms.
1—B & P, 19" Tractor Type, 13' Arm.
1—B & P, 16" Tractor Type, 13' Arm, Magnetic Tower, 4' Ramming 4" Tip.
2—B & P, Model 16S-DB Stationary Type, 16" Head.
2—B & P Swing Type Slingers, 19" Head.
1—B & P Stationary, Double Belt 4' Impeller, 22" head, 5" tip w/50 HP Motor, 10' Jib Arm, 1948.
2—B & P Stationary, Double Belt, 4' Impeller, 19" Head, 4" Tip, 6' Jib Arm.
3—PLATE FEEDERS—7' Diameter x 18' Depth, with 10 HP motor & reducer.

SHAKEOUTS SCREENS

1—SIMPLICITY 4' x 10' Model D, 16,000#.
1—HEWITT-ROBINS 36" x 78", Vibrex.
1—LINK BELT 5' x 10' heavy duty.
1—SIMPLICITY 6' x 8' Model DE, 16,000#.
3—SIMPLICITY 4' x 10' Model B Single Deck Sifter Screens, with 10 HP Motors.

TUMBLING BARRELS

2—SLY 42" x 72" Square, 10 HP, Gearhead with Built-in Brake. Timken Bearing.
2—SLY 36" x 84" Type C, 7½ HP. Gearhead Built-in Brake. Timken Bearing.
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1—SLY 48" x 96" w/Motor & Drive & Mag. Brake, Timken Bearing.
1—SLY 72" x 120" w/Motor ½ Drive & Mag. Brake, Timken Bearing.
1—SLY 36" x 54" Type C, Round Type w/5 HP V-Belt Drive.

SAND BLAST EQUIP.

1—AMERICAN 86" diameter swing table with dust collector.
1—AMERICAN No. 3 tablast, 4-48" auxiliary tables.
1—AMERICAN No. 1 tablast 7-14" auxiliary tables.
1—AMERICAN 27" x 36" Tumblast with skip hoist, shot return & electrical.
1—AMERICAN 36" x 42" Tumblast with Skip Hoist, Shot return & electrical.
1—AMERICAN 42" x 48" Tumblast, with Skip Hoist. Shot return & electrical.
1—HOLLINGSWORTH Model 44" x 48".
1—HYDRO-BLAST cabinet, 40 HP motor and pump.

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1—GENERAL ELECTRIC X-RAY, Industrial Type. Model KX10, 140 KW.

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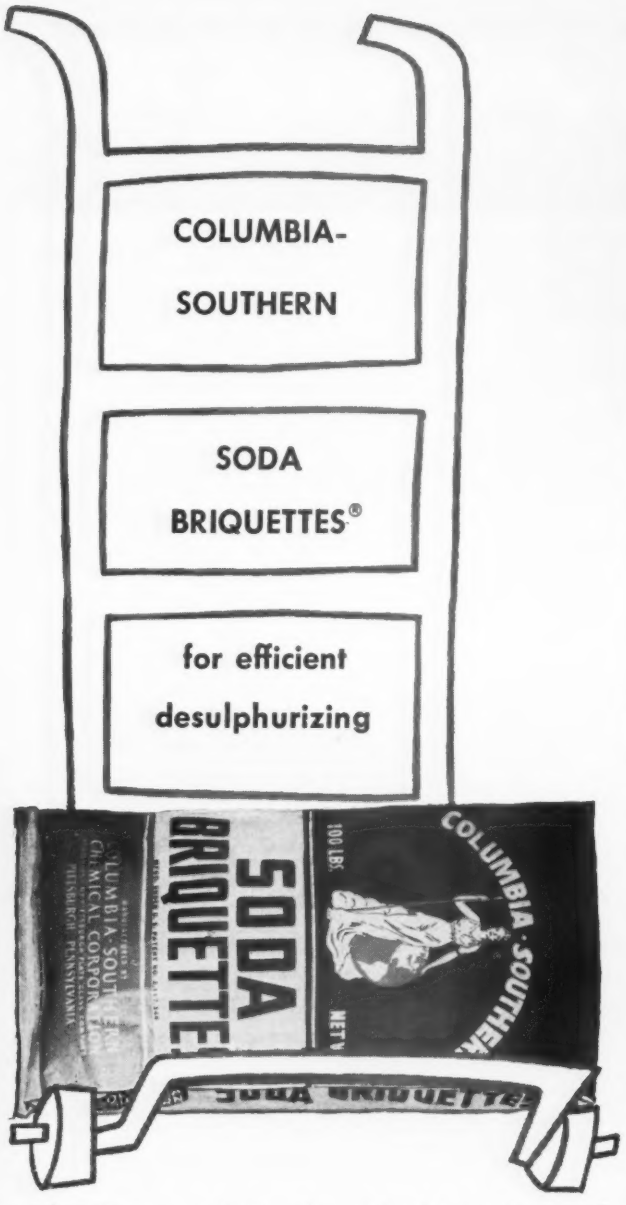

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Circle 807 on Inquiry Card—Page 255

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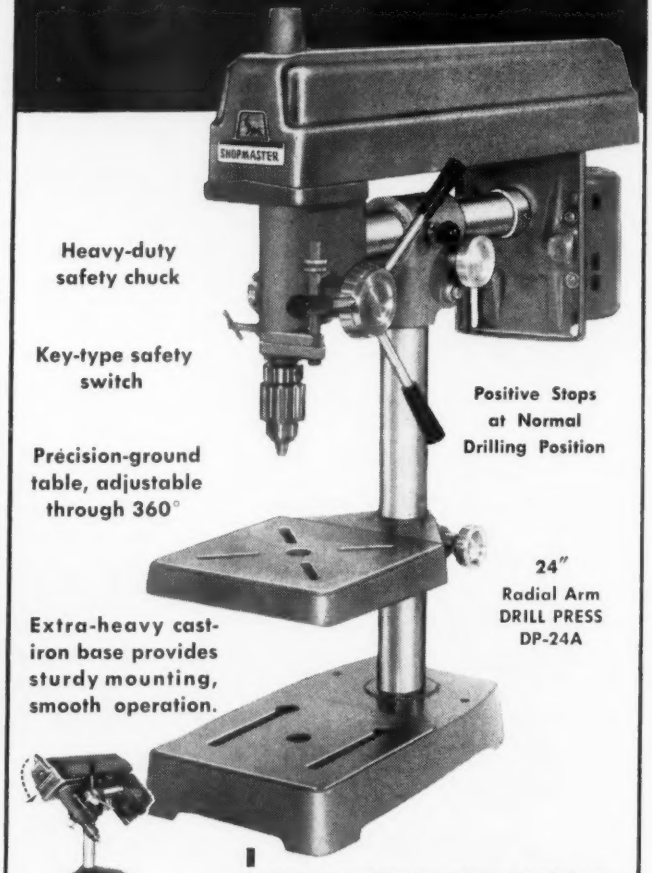
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Circle 808 on Inquiry Card—Page 255

Advertising Index

Accurate Match Plate Co. 21
Acheson Colloids Co. 13
Acme Foundry Co. 283
Acme Resin Corporation 287
Adams Co., The 82
Airmatic Valve, Inc. 305
Air Reduction Sales Co., A Division of Air Reduction Co. 58
Ajax Electric Co. 199, 247
Ajax Engineering Corporation 199, 247
Ajax Electric Furnace Co. 199, 247
Ajax Electrothermic Corporation 199, 247
Alabama By-Products Corporation 157
Allied Chemical & Dye Corporation, Semet-Solvay Division 220
Allis-Chalmers Manufacturing Co., Buda Division 6
Alloy Metal Abrasive Co. 165
American Air Filter Co., Inc. 167
American Chain & Cable, American Chain Division 250
American Gum Products Co. 298
American-Marietta Co., Presstite-Keystone Engineering Products Co., Division 224
American MonoRail Co. 70
American Optical Co., Safety Products Division 89
American Saw & Manufacturing Co. 300
American Smelting & Refining Co., Federated Metals Division 246
Anderson Pattern, Inc. 248
Ansco Corporation 11
Archer-Daniels-Midland Co., Foundry Products Division 4, 5

Babcock & Wilcox Co., The, Refractories Division 63
Baird Associates 168
Baker-Raulang Co., The 86
Bartlett, C. O., & Snow Co., The ..... Back Cover
Beardsley & Piper Division, Pettibone Mulliken Corporation 189, 190, 216, 217
Becker Brothers Carbon Co. 264
Berkshire Chemicals, Inc. 300
Black, Sivalls & Bryson, Inc. 206
Borden Co., The 194
Borg-Warner Corporation, Industrial Crane & Hoist, Ingersoll Products Division 29
Branford Co., The 299
Buda Division, Allis-Chalmers Manufacturing Co. 6

C & S Products Co. 183
Campbell-Hausfeld Co., The 12
Carborundum Co., The ..... Inside Front Cover
Carman, Edwin S., Inc. 304
Carpenter Brothers, Inc. 275
Carrier Conveyor Corporation 213
Catalin Corporation of America 94
Centrifugal Casting Machine Co. 299
Cerro De Pasco Corporation 296
Chicago Eye Shield Co. 271
Chicago Pneumatic Tool Co. 48
Chicago Rubber Co., Inc. 274
Chisholm-Moore Hoist Division, Columbus-McKinnon Chain Corporation 205
Christiansen Corporation 272
Cincinnati Grinding Wheels 84, 85
Cities Service Oil Co. 97
City Pattern Foundry & Machine Co. 23
Clark Equipment Co., Construction Machinery Division 47
Clark Equipment Co., Industrial Truck Division 41
Clearfield Machine Co. 245
Cleveland Flux Co., The 87
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 96
Climax Molybdenum Co. 81
Coles Cranes, Inc. 242
Columbia-Southern Chemical Corporation 318
Columbus-McKinnon Chain Corporation, Chisholm-Moore Hoist Division 205
Combined Supply & Equipment Co., Inc. 299
Commercial Contracting Corporation 301
Crucible Manufacturers Association 208
Curtis Manufacturing Co., Pneumatic Division 26

Daniels, C. R., Inc. 290
Dayton Pneumatic Tool Co. 297
DeBardeleben Coal Corporation 302
Deister Concentrator Co., The 293
Delta Oil Products Co. 22
Demmler, William, & Brothers 170
Desmond-Stephan Manufacturing Co., The 289
Despatch Oven Co. 181
Detroit Electric Furnace Division, Kuhlman Electric Co. 226
Dietert, Harry W., Co. 69
Dings Magnetic Separator Co. 186
Dow Corning Corporation 40
Durex Refractories Co. 230
Durez Plastics Division, Hooker Electrochemical Co. 227

Eastern Clay Products Department, International Minerals & Chemical Corporation 90, 91
Eastman Kodak Co., X-Ray Division 249
Electric Controller & Mfg., Square D Co., Division 262
Electric Furnace Co., The 302
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corporation 54, 55
Elwell-Parker Electric Co., The 78
Erie Strayer Co. 14
Essex Rotary File & Tool Corporation 297

Fanner Manufacturing Co., The 95
Federal Foundry Supply Co., The 2, 30, 31
Federated Metals Division of American Smelting & Refining Co. 246
Flick-Reedy Corporation, Miller Fluid Power Division 56
Flick-Reedy Corporation, Tru-Seal Division 298
Foundry Educational Foundation 68
Foundry Equipment Co., The 57
Foundry Rubber, Inc. 215
Foundry Services, Inc. 238
Foundry Supplies Manufacturing Co. 28

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Advertising Index

Foxboro Co., The 20
Fox Grinders, Inc. 169
Fremont Flask Co., The 16

Gardner-Denver Co. 88
Gates Rubber Co., The 143
General Aniline & Film Corporation 11
General Electric Co. 251
Girdler Co., The 204
Globe Steel Abrasive Co., The 236
Goodrich, B. F., Industrial Products Co. 1
Gordon, Claud S., Co. 275
Great Western Manufacturing Co. 321
Green, A. P., Fire Brick Co. 243
Guardite, Inc., Hydro-Blast Division 152

Harbison-Walker Refractories Co. 196, 197
Hartley Controls Corporation 234
Henning Brothers & Smith, Inc. 304
Hercules Powder Co. 221
Herman Pneumatic Machine Co., The 64, 65
Hewitt-Robins 50, 51
Hickman, Williams & Co. 166
Hinckley Industries, Inc. 297
Hines Flask Co., The 8, 9
Holcroft & Co. 281
Hooker Electrochemical Co., Durez Plastics Division 227
Hough, Frank G., Co., The 159
Hunt, C. B., & Son, Inc. 280
Hydro-Blast Division, Guardite, Inc. 152
Hyster Co. 38

Illinois Clay Products Co. 261
Illinois Testing Laboratories, Inc. 207
Imperial Belting Co. 10
Industrial Crane & Hoist, Ingersoll Products Division, Borg-Warner Corporation 29
Ingersoll-Rand 74
International Molding Machine Co. 53
International Nickel Co., Inc., The 305
Ironton Fire Brick Co., The 205, 207, 209

Jeffrey Manufacturing Co., The 92
Jersey State Chemical Co. 93
Jo-El Co. 303
Johns-Manville 292
Johnston Manufacturing Co. 248

Kane & Roach, Inc. 304
King Tester Corporation 305
Kirk & Blum Manufacturing Co., The 192
Knight, Lester B., & Associates, Inc. 160
Kuhlman Electric Co., Detroit Electric Furnace Division 226
Kux Machine Co. 66
Kwik-Mix Co. 244

Lanly Co., The 187
Lectromelt Furnace Co. 49
LeRoi Division, Westinghouse Air Brake Co. 201
Lindberg Fisher, A Division of Lindberg Engineering Co. 80
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation 42
Link-Belt Co. 153
Lithium Corporation of America, Inc. 46
Logan Co. 188
Louthan Manufacturing Co., The 290
Lurie Brothers 276

Magnaflux Corporation 39
Magnet Cove Barium Corporation 147
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 52
Manning, Maxwell & Moore, Inc. 272
Martin-Decker Corporation 303
Master Pneumatic Tool Co., Inc., The 295
Mathews Conveyer Co. 154
Mayer, Carl, Corporation, The 203
May-Fran Engineering, Inc. 178
Metal & Thermit Corporation 296
Michigan Oven Co. 288
Milwaukee Chaplet & Manufacturing Co. 222
Miller Fluid Power Division, Flick-Reedy Corporation 56
Minnesota Mining & Manufacturing Co. 59
Modern Equipment Co. 322
Monsanto Chemical Co. 75
Moulders' Friend, The 223
Mullite Refractories Co., The 282
Murphy, James A., & Co., Inc. 300

National Carbon Co., A Division of Union Carbide & Carbon Corporation 76, 77
National Engineering Co. 7
National Lead Co., Titanium Alloy Manufacturing Division 295
National Metal Abrasive Co., The 218
Newaygo Engineering Co. 172, 173
Newcomb-Detroit 303
Nicholls, William H., Co., Inc. 211
Nichols Engineering & Research Corporation 27
Norgren, C. A., Co. 184
Norton Co. 24, 25, 32, 263
Numatics, Inc. 161

Ohio Crankshaft Co., The 83
Ohio Electric Manufacturing Co., The 60
Olin Mathieson Chemical Corporation 73
Oliver Machinery Co. 302
Orefraction, Inc. 235
Osborn Manufacturing Co., The 162, 163

Pangborn Corporation 61, 229
Penn Iron Works, Inc. 301
Pennsylvania Glass Sand Corporation 185
Penola Oil Co. 145
Petersen Oven Co., The, Stroman Furnace & Engineering Co., Division 219
Pettibone Mulliken Corporation, Beardsley & Piper Division 189, 190, 216, 217
Philadelphia Quartz Co. 304
Pickands Mather & Co. 273
Picker X-Ray Corporation 72
Pipe Line Development Co., The 209
Pittsburgh Coke & Chemical Co. 155
Pittsburgh Metals Purifying Co. 237
Plastics Engineering Co. 79
Porter, H. K., Co., Inc., Quaker Rubber Division 231
Presstite-Keystone Engineering Products Co., A Division of American-Marietta Co. 224
Pyle Pattern & Manufacturing Co. 71

Quaker Rubber Division, H. K. Porter Co., Inc. 231

Raybestos-Manhattan, Inc., Manhattan Rubber Division 52
Redford Iron & Equipment Co. 62
Reichhold Chemicals, Inc. 179
Republic Steel Corporation 98, 99
Robeson Process Co. 298
Roura Iron Works, Inc. 288
Royer Foundry & Machine Co. 139

Scheu Products Co. 296
Schneible, Claude B., Co. 302
Semet-Solvay Division, Allied Chemical & Dye Corporation 220
Shieldalloy Corporation 156
Shopmaster, Inc. 318
Sidley, R. W., Inc. 302
Silent Hoist & Crane Co. 195
Simonds Abrasive Co. 239
Smillie, C. M., & Co. 298
Smith & Richardson Manufacturing Co. 215
Smooth-On Manufacturing Co. 301
Spincraft, Inc. 282
SPO, Incorporated 44, 45
Square D Co., Electric Controller & Mfg., Division 262
Standard Electrical Tool Co., The 270
Standard Silica Co. 15
States Engineering Corporation 298
Stearns Magnetic, Inc. 210
Steel City Testing Machines, Inc. 158
Steel Shot Producers, Inc. 266
Sterling Wheelbarrow Co. 100, 234
Stevens, Frederic B., Inc. ..... Inside Back Cover
Stroman Furnace & Engineering Co., Division of The Petersen Oven Co. 219
Swindell-Dressler Corporation 241

Tabor Manufacturing Co. 233
Tamms Industries, Inc. 220
Taylor, S. G., Chain Co., Inc. 269
Thiem Products, Inc. 43
Thor Power Tool Co. 284
Titanium Alloy Manufacturing Division, National Lead Co. 295
Tru-Seal Division, Flick-Reedy Corporation 298

Union Carbide & Carbon Corporation, Electro Metallurgical Co. 54, 55
Union Carbide & Carbon Corporation, Linde Air Products Co., Division 42
Union Carbide & Carbon Corporation, National Carbon Co., Division 76, 77
United States Graphite Co., The 17
United States Rubber, Mechanical Goods Division 193
Universal Engineering Co. 265

Vanadium Corporation of America 177

Walley & Associates 304
Wedron Silica Co. 151
Westinghouse Air Brake Co., LeRoi Division 201
Westover Corporation 264
Wheelabrator Corporation 36, 37, 225, 268, 269
Whitehead Brothers Co. 35
Whitehead Metal Products Co., Inc. 214
Whiting Corporation 141

Classified Advertisers 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317

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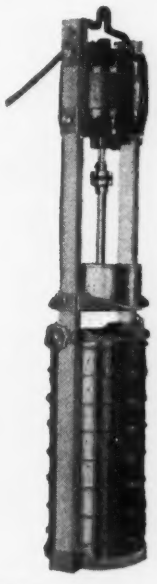

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for sand control
$250.00 (without sieves)

TYPE "CS"
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with 24″ sieve
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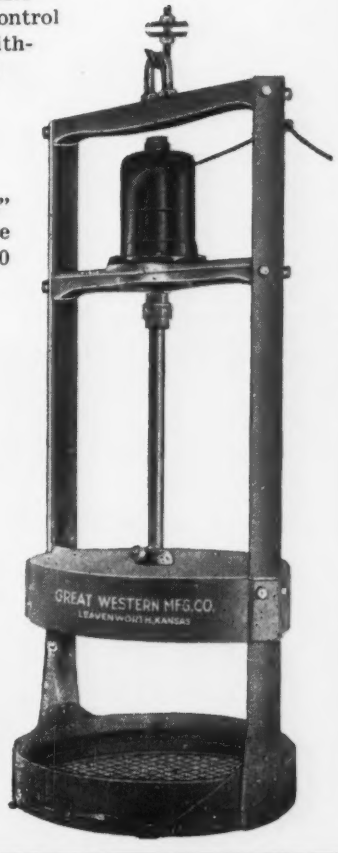

These Combs Foundry Riddles cost less than 1c an hour for power. You can remove the steel rim, empty it and replace it in just seconds. You save up to 97% on your labor costs.

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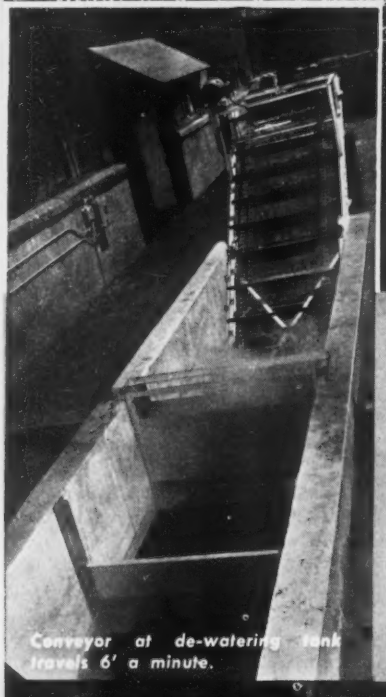

Conveyor at de-watering tank travels 6' a minute.

...tal is thoroughly mixed as it flows continuously through the 4000 lb., MODERN forehearth.

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ERECTION...

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- **Slag flowing continuously from front-spout to drag-out . . .**
- **Dust and ash are trapped behind a water curtain . . .**
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MODERN

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Port Washington, Wis.

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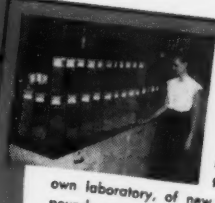

STEVENS FOUNDRY FACINGS LABORATORY

In line with Stevens continuous testing and evaluating in their own laboratory, of new minerals and refractory compounds as possible bases for future foundry products, Stevens have also conducted tests in conjunction with Armour Research Foundation, Chicago. Some of the coating sections undergoing tests are shown.

WANT MORE INFORMATION ON ANY OF THESE PRODUCTS?

Contact your Stevens representative or write direct—Frederic B. Stevens, Inc., 1812 Eighteenth Street, Detroit 16, Mich.

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